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RACIC report

(U) DEFOLIATION-INCIDENTS CORRELATION STUDY

Report No. RACIC-TR-54

April 1, 1967

prepared for

ADVANCED RESEARCH PROJECTS AGENCY
PROJECT AGILE

Contract No. SD-171
ARPA Order No. 324

by

R. N. Pesut and W. P. Virgin

REMOTE AREA CONFLICT INFORMATION CENTER
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Director
Advanced Research Projects Agency
Office of the Secretary of Defense
Washington, D. C. 20301

Attention Project AGILE

Dear Sir:

Enclosed is a copy of our report "(U) Defoliation-Incidents Correlation Study", RACIC-TR-54.

This study was one of several studies conducted by the "Operations Analysis Team" headed by Dr. K. L. Nielsen of Battelle Memorial Institute, Columbus Laboratories, and was initiated by LCDR F. B. Boice of ARPA.

We will welcome any comments you may have in regard to this study.

Sincerely,

J. T. Brown

J. T. Brown
Project Director
RACIC

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PREFACE

(U) This research was supported by the Advanced Research Projects Agency of the Department of Defense and was monitored by ARPA/AGILE under Contract Number SD-171. The ARPA/AGILE monitor was LCDR Frank Boice. For RACIC, the project was under the technical control of Dr. K. L. Nielsen. The study was performed by Mr. R. N. Pesut and Mr. W. P. Virgin.

ABSTRACT

(U) Defoliation operations have been conducted for the past several years in South Vietnam as a measure to reduce the effectiveness of Viet Cong operations and, at the same time, increase the effectiveness of friendly forces. To date no extensive look had been taken at possible changes in VC activity resulting from the defoliation. These changes may result in fewer VC incidents, changes in magnitude or types of incidents, or possibly an increase in the number of incidents. The Advanced Research Projects Agency assigned RACIC the task of examining the VC activity in these defoliated areas in order to detect possible changes. This report presents the results of that study.

(C) Eight geographic regions in which extensive defoliation has been performed were studied. The region boundaries were chosen so that the defoliation targets within each region would be of the same type. The types of regions include coastline, delta, rivers, and roads.

(C) Possible effects of defoliation on VC-initiated activity are often masked by other factors such as increased presence of friendly troops in the region. In general, no conclusive effects could be assigned to defoliation alone, although analysis of some regions suggests decreased VC activity following defoliation.

(U) Recommendations for further action are presented.

SUMMARY OF REPORT

(U) Defoliation operations have been conducted over specific areas of the Republic of South Vietnam for the past several years. The purpose of the defoliation is to remove vegetation which might provide cover for the Viet Cong, thereby reducing their effectiveness and increasing the effectiveness of friendly forces.

(U) The objective of the study reported herein was to determine whether defoliation affects VC activity.

(C) Data on past defoliation and crop-destruction missions were obtained and eight geographic regions where defoliation had been carried out were selected. The regions were selected to cover a variety of situations, including areas where defoliation had been performed on roads, coastlines, and around military posts.

(C) Viet Cong-initiated incident data covering the selected portion of the country were obtained from the Defense Intelligence Agency. The data for each incident include the map coordinates of the action, the date and time, the VC objective codes and VC action codes. Objective codes describe the point of attack, action codes, and the nature of the incident. The data were received in the form of magnetic tapes and special computer programs were written to extract incident data for the selected study areas.

(C) Counts of the incidents in each study region were made on a monthly basis for a period extending one year on each side of the defoliation date. Separate counts were made by type of objective and by type of action.

(C) The results of the study can be summarized as follows:

(1) VC actions against all objectives were found to decrease following defoliation.

(2) Monthly incident counts show a seasonal variation with peaks in June-July and December-January. Defoliation spraying is often performed during those months so that subsequent declines in VC activity cannot necessarily be attributed to the results of the spraying.

(3) There is evidence that defoliation is often followed by increased air and ground activity of friendly forces. While defoliation may increase the effectiveness of air-to-ground targeting, it is not possible, with the available data, to separate the effects of the defoliation-aircraft combination from the effects of increased presence of ground forces.

(4) This study should not be interpreted as meaning that defoliation does not have an effect on VC incidents, but that not enough information is available to detect the defoliation effects.

(C) Three recommendations are made as a result of the study:

(1) Defoliation effects would become clearer if seasonal effects could be removed from the data. Further work should include investigation of methods for removing the seasonal portion of the data variability.

(2) Defoliation is often followed by increased air and ground activity. The present study does not reveal the roles of these forces, either separately or in conjunction with defoliation, on VC activity. As an aid to determining these effects some information about the presence of friendly forces should be made available.

(3) Reports of spraying missions are not complete enough to identify the defoliation target in all instances. It is recommended that if further work is done, more complete mission reports be supplied as well as all available defoliation evaluation reports.

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(U) DEFOLIATION-INCIDENTS CORRELATION STUDY

by

R. N. Pesut and W. P. Virgin

INTRODUCTION

Background

(U) Defoliation operations have been conducted over specific areas of the Republic of South Vietnam for the past several years. The purpose of the defoliation is to remove the cover which exists in an area, thereby reducing the effectiveness of Viet Cong (VC) operations in the area, and increasing the effectiveness of friendly forces. Some studies have been conducted on the psychological reactions of VC to defoliation operations and on the attitudes of the inhabitants of the Vietnamese villages as they relate to these operations. However, no extensive look had been taken at possible changes in VC activity in the defoliated areas. Such changes might result in fewer total VC incidents, changes in the magnitudes or types of incidents, or even possibly a greater total number of incidents. If an examination of VC activity in an area indicated that a change occurred, then the area could be flagged for further research, to see if defoliation might have been the cause or if other causes could be pinpointed.

(U) The Advanced Research Projects Agency (ARPA) assigned the Remote Area Conflict Information Center (RACIC) at Battelle Memorial Institute (BMI) the task of examining these defoliated areas in order to detect possible changes in VC-initiated activity. This report presents the results of that study.

Objective of the Study

(U) The objective of this study was to attempt to correlate VC activity with past aerial defoliation operations in specific areas of South Vietnam to determine the effects, if any, of such operations as they apply to the VC. If any changes were observed, they were to be reported to ARPA/AGILE who would attempt to gain more information for further research into these changes as they apply to the overall context of the war. It was recommended that techniques used by Schwartz* in his work on locating guerrillas be applied to the problem.

* Schwartz, A. I., "A Method for Finding Guerrillas (Applied to South Vietnam)" (U), Institute for Defense Analyses, Weapons Systems Evaluation Division, May 1966 (Secret).

SUMMARY

(U) This task involved two major problems: selection of the areas for study and analysis of the incident data.

(C) Data on defoliation and crop-destruction missions were supplied to RACIC by ARPA/AGILE. Locations of these missions were plotted to aid in the first phase of the study – choice of study areas. It was decided to limit the study to about the southern third of the country since this section included most of the defoliated areas and at the same time decreased the amount of incident data needed. Eight geographic regions were then chosen for study. The regions were selected to cover a variety of situations, including areas where defoliation had been performed on roads, rivers, coastline, and around military posts.

(U) Viet Cong-initiated-incident data covering the selected portion of the country were obtained from the Defense Intelligence Agency. The information was received in the form of magnetic tapes, one for each year, 1963 through 1966. A printout of each tape was also received.

(U) Three computer programs were written to facilitate handling of the data tapes. Two of the programs were used to rewrite the tapes in a format for speedier operation and for editing. The third program was used to select, from the tapes, all incidents which fall into specified categories, to count the selected incidents, and to print them. The categories under which selection can be made are: VC action code, VC objective code, geographical area, and date of incident. The programs were used to search the data tapes for all incidents which had occurred within the defined geographic regions. Following printout of the data, they were edited.

(C) The second phase of the study consisted of analyzing the data. For some regions the amount of available data was not sufficient for the application of standard statistical techniques. It was recognized that factors other than defoliation would affect the VC activity in a region; thus, it seemed appropriate to exhibit the data in such a fashion that changes in the level and type of activity could be visually detected. Consequently, the VC-activity data were summarized in monthly intervals, both before and after defoliation. The data were summarized according to (1) the type of VC objective and (2) the type of VC action against the objective. The summarizations by type of action were weighted using a weighting scheme proposed and used by Schwartz.* This scheme is intended to show the level of effort expended by the VC for several classes of action. In addition, several activity measures were defined and calculated for each region.

* Ibid.

(C) It was found that the number of VC-initiated incidents decreased in the study regions. However, there was little consistency in the changes exhibited against several types of VC objectives. Furthermore, monthly incident counts show seasonal variations, with the defoliation dates often coinciding with the months of peak activity. Subsequent declines in VC activity cannot necessarily be attributed to the results of the spraying. Defoliation is also often followed by increased air and ground activity by friendly forces, which could account for the decreased VC activity. This study did not attempt to determine the separate effects of aircraft, ground forces, and defoliation.

METHOD OF ANALYSIS

(U) In determining the effect of defoliation on VC activity, basically two problems are involved: (1) the selection of the areas of South Vietnam to be studied and (2) the extraction of data on VC activity for the selected areas and interpretation of these data. The manner in which these two problems were handled is described below.

Selection of Study Areas

(C) The areas selected for study were chosen on the basis of the plots of the defoliation data available. Data on defoliation and crop-destruction missions were supplied by ARPA/AGILE. For each mission, the data include: the task type (defoliation or crop destruction), the province name, coordinates of the mission, the area sprayed, the date of spraying, and the type of operation (aircraft or hand spray). The data were put into punched cards for easier sorting and listing.

(C) Many of the data, particularly for the early missions (1963), are not usable because of illegibility of the data sheets or because of incompleteness of the data, e.g., no coordinates given.

(C) The locations of the defoliation missions were initially plotted on a 1:4,500,000 map as shown in Figure 1. On the basis of this plot, it was decided to study the lower third of the country, since this would include the majority of the defoliated areas and would decrease the amount of incident data requested from the Defense Intelligence Agency data bank.

(C) Each of the defoliation missions was next plotted on overlays for maps in a scale of 1:250,000. Where a single coordinate was given for the mission, the

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FIGURE 1. LOCATIONS OF DEFOLIATION MISSIONS IN SOUTH VIETNAM (U)

point was simply marked on the overlay. Where two or more coordinates were given, it was usually possible to determine the defoliation target by examining the map. For example, if two mission end-points lay on a river, the defoliated path was marked along the river, following its curves between the given end-points.

(C) As a result of these plots, eight regions in which extensive defoliation had been performed were chosen for study. The regional boundaries were defined so that the defoliation targets within each region were of the same type. The regional types include coastline, rivers, roads, and such man-made features as military posts.

(C) Although the primary purpose of this task was to study aerial spraying, some areas which were hand sprayed were included.

(C) Table 1 gives the defoliation date, number of hectares sprayed for each selected region, and an indication of the type of region. The general locations of the regions are shown in Figure 2. More detailed maps (scale 1:250,000) for each area are given in the section where each region is discussed.

Analysis of Activity Data

(C) Three major aspects are involved in determining the effect of defoliation on the VC-initiated activity in a given geographical area:

(1) The type of VC activity data available for the analysis
(2) The handling procedures to prepare the data for the analysis
(3) The techniques employed for analyzing the data.

Each of these aspects is considered individually below.

Data Used in the Analysis

(C) The activity data used in the analysis were obtained from the VC-initiated incidents reported in the Daily Situation Reports (DSR) of the Military Assistance Command, Vietnam (MACV). A complete listing of each entry in the data file for the area of SVN described provided the following information about VC-initiated incidents:

Coordinates of the Action. Universal Transverse Mercator (UTM) grid coordinates locating the geographic position at which the VC-initiated action occurred.

TABLE 1. CHARACTERISTICS OF SELECTED DEFOLIATED AREAS (U)

Region	Type	Defoliation Dates	Area Sprayed[a], ha
1	Bo De and Cua Lon Rivers	6/63	358
		2/64	1,259
		8/66	1,983
2	Southeast coast	3/65 to 5/65	63,380
		12/65 to 2/66	9,067
		4/66 to 7/66	2,290
3	River	4/65	460
		12/65	4,760
4	Road	10/65	11
		12/65	1,109
5	Posts	2/65 to 4/65	127
		8/65 to 11/65	33
6	River	1/65	315
		9/65	60
		11/65 to 12/65	1,840
7	River, Rung Sat S. Z.	4/64	,480
		3/65	635
		1/66 to 2/66	7,040
8	Roads	12/65 to 4/66	6,880
		6/66	615
		9/66	155

(a) 1 hectare = 2.47 acres.

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FIGURE 2. LOCATIONS OF SELECTED STUDY REGIONS (U)

(C) Start-Stop Date and Time. The year, month, day, and time of day that an incident was started or stopped. (In most reports, the times listed for start and stop were identical.)

(C) Objective Code. Numeric code indicating the person(s) or object(s) comprising the target toward which the incident was directed.

(C) Action Code. Alpha-numeric code indicating the type of incident that occurred.

(C) Unit. Code indicating the friendly forces involved in the incident.

(C) Losses. The number of persons KIA, WIA, and MIA.

(C) Comments. Information that enlarges on the coded information to further identify the incident.

(C) A listing of all entries that occurred in the area to be studied, essentially the lower third of the Republic of South Vietnam, from the initiation of the data file in 1963, was requested. This listing consisted of more than 55,000 individual entries.

Data-Handling Procedures

(U) The DIA data bank furnished the incident data covering the portion of the country selected for the study in the form of magnetic tapes, one for each year, 1963 through 1966. Two copies of each tape were made at Battelle on the Control Data 3400 computer. The copied tapes were compared with the originals, by means of a special program, to ensure correct copying. The original tapes were then returned to the DIA.

(U) Three computer programs were written to handle the magnetic tapes. These programs are described below.

Program JOIN. (U) Tapes received from DIA were written in the ASR format (Appendix A). In this format, the data for each incident comprise one record. A file record and an end-of-file mark are at the start of each tape. Program JOIN reads tape in the ASR format and writes a new tape on which the initial file record and the end-of-file mark are eliminated and the incidents are written in groups of 100 incidents to a record. This will be referred to as the BMI format. Having the records grouped in this way speeds up subsequent searches for a particular record or set of records.

Program EDIT. (U) Instances of incomplete records or of multiple records for a single incident occur. Program EDIT can be used to eliminate such records from the file. The program can be used with tapes written in either the ASR or BMI format.

Program SELECT. (U) This program is used to read the magnetic tape, to select from it all incidents which fall into specified categories, to print the selected incidents, and to count them. The categories under which selection may be made are: VC action code, VC objective code, geographical area, and date of incident. Specific instructions regarding selection in each category are entered into the computer on leader cards. New leader cards may be entered during the course of a run.

(U) The program permits the naming of a group of VC action codes so that an incident having an action code that matches any one of the codes in the group will be selected. In the same way it is possible to select incidents having an objective code that matches any one of a prespecified group of objective codes. If no action or objective group is specified, all incidents will be selected on the basis of geographical coordinates or of time.

(U) Incident selection on the basis of geographical coordinates may be made by specifying no coordinates (take all incidents wherever they occurred), one coordinate (take all incidents occurring at that point), two coordinates (take all incidents on the line between the coordinates), or four coordinates (take all incidents occurring within the parallelogram defined by the four points).

(U) Incident selection on the basis of date of occurrence can be made by naming a date, an interval size, and the number of intervals to be considered. The intervals can be specified to fall before the date, after the date, or on both sides of the date. Incidents which occurred within the range of the intervals will be selected and a table showing the number of incidents within each interval will be printed. If no date is specified, all incidents will be selected.

(U) The SELECT program has been designed to work with tapes in either the ASR or BMI formats.

(U) After areas were selected for study, the data tapes were searched and all incidents that satisfied the conditions for the selected areas were printed out. At this point, it was necessary to edit or "purge" the data to remove those entries which appeared in duplicate. Rather than scan each of the entries on the tape, the editing of the data was deferred until listings of incidents were received for each of the selected defoliated areas to be studied. This reduced the amount of editing

considerably and since all the incidents for a localized area were printed on a comparably short listing, it was easier to detect duplications of entries. Several types of duplication occurred. The most easily detected were those that were identical for each bit of information – same coordinates, same date and time, same objective code, same action code, etc. Other duplications occurred when several reports were submitted by different persons involved in the incident. Sometimes these entries were identical in every respect; at other times, they differed slightly in the coordinate or the time of day. This section type of duplication, i.e., differing slightly in the coordinate, was detected by first noting that the entries agreed in all other respects, calculating the distance between the two different coordinates listed (where a difference in the last digit in the "X" or "Y" direction is a distance of 100 meters or 328 feet), and considering these entries as duplications if this distance was not too extreme. Another kind of duplication occurred when actions of more than one type were employed in the incident or the incident had more than one target. In these cases, separate entries were often listed, agreeing in every respect except the action codes and/or objective codes. These entries were combined, listing all the action codes and/or objective codes as one entry. Later, those codes which represented the most serious aspects of the incident were chosen to represent the incident in the analysis. These types of duplications were the only ones that were detected in the editing process, and as much of this duplication was removed as possible. The result of this editing was a separate listing of all incidents that occurred within each defoliated area to be studied for the time period of interest. Once these listings were obtained, the analysis of the data for each area could proceed.

Analysis Techniques

(C) Initially, attempts were made to apply existing statistical techniques in the analysis of the data. Several difficulties were encountered almost immediately. The first difficulty was the fact that the analysis would have to apply to very small sample sizes since the number of data points would be small. If data were collected for 12 months before defoliation and 12 months afterward (provided such data exist), and were summarized as monthly totals of incidents, there would be at most 24 such points. If an attempt is made to pair the "predefoliation" data with the "post-defoliation" data in order to work with paired comparisons, there would be only 12 data points. Another difficulty encounted was that of removing extraneous factors that could affect the activity in a particular area. These extraneous factors include seasonal effects, availability of targets, VC plans for the area, etc. Also, nonparametric tests were not successful since these tests for detecting trends had very low power for the small sample sizes available, where power is measured as the probability of rejecting the hypothesis of no trend when in fact there is some trend. Consequently, rather than attempt to apply statistical methods to detect trends, which might be misleading in light of all the other factors that could affect

activity besides defoliation, it was decided instead to display the dat n a fashion that would allow the observer to detect "possible" trends by sight; th e would then be evaluated along with the other factors. The various method sed to summarize the data are discussed below.

(C) First, it was necessary to determine the length of tne time period which would be studied. A time period was selected beginning 12 months before defoliation, and ending 12 months after defoliation. This interval was chosen since it provides, for analysis purposes, 1 year of data before and after defoliation has taken place.

(C) Originally t was thought that intervals of 15 months on each side of the start of defoliation would be most suitable. This would allow a period of 3 months for the defoliation to become fully effective, and still leave a period of 12 months in which to observe any possible effects as the foliage regrew. As the analysis proceeded it became clear that there were definite seasonal effects on the level of VC activity. Intervals of 15 months before and after defoliation created the possibility of including data from 3 months of low seasonal activity in one interval and data from 3 months of high seasonal activity in the other. Since this tended to obscure effects due to defoliation alone, it was abandoned in favor of the 12-month intervals.

(C) The incident data were grouped into monthly intervals to aid in detecting trends in the activity. They were then further grouped in two ways: by type of objective and by type of action.

(C) Within each of the eight study regions, the defoliation missions were directed toward a specific type of target such as roads, river banks, etc. If defoliation were to have direct effects in the defoliated area, then it would be reasonable to expect a decline in the number of incidents against objectives associated with the type of defoliation target. In other words, along roads whose margins have been defoliated, one might expect a decline in incidents against roads and vehicles; where river banks were defoliated a change in incidents involving watercraft might be found. Consequent y, counts were made of the number of incidents in each month for each of the objective groups shown in Figure 3. A complete listing of the codes and their meanings is given in Appendix C. These counts were also found to be useful in analyzing the general activity in a region, even where the total of all incidents showed no change after defoliation.

(C) A second division of the data, within each month, was made according to the type of action. The action types are grouped into four categories; these are shown in Figure 4 which is a worksheet used in the analysis. (Copies of this worksheet for each of the regions analyzed are given in Appendix B.) The action types are grouped into four categories on this worksheet. These four categories are the same grouping as used by Schwartz* in his work on locating guerrillas and

* Ibid.

Objective Groups	Codes (CINPAC)
Roads, vehicles, bridges, culverts	50, 51, 52, 53, 54, 56, 57, 58, 70, 71, 73, 97
Military posts, bases, watchtowers	10, 11, 12, 14, 15, 16, 17, 18, 19
Villages, hamlets, civilian facilities	20, 21, 22, 23, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 9, 7, 8
Military units	85, 86, 88, 89
Aircraft	40, 41, 42, 43, 44, 45
Boats, canals	13, 60, 61, 62, 63, 64, 78, 79
Civilians	80, 81, 82, 83, 84
Materiel (food, firearms, etc.)	90, 91, 92, 93, 95, 2
Utilities	7, 8, 76, 77, 96
An area otherwise unspecified	94
Trains, railroad bridges, tracks	55, 72, 74, 75

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FIGURE 3. VC OBJECTIVE CODE GROUPS (U)

	BEFORE DEFOLIATION								AFTER DEFOLIATION							
	Periods			Action Groups				Weighted Totals	Periods			Action Groups				Weighted Totals
	Day	Month	Year	A_1, A_2 A_3, A_4	M_1, M_8 S_3, H_1 H_2, H_3 H_5	T_1, T_6 S_1, S_2 M_2, M_7 H_4	E_1, E_3 P_1, P_5		Day	Month	Year	A_1, A_2 A_3, A_4	M_1, M_8 S_3, H_1 H_2, H_3 H_5	T_1, T_6 S_1, S_2 M_2, M_7 H_4	E_1, E_3 P_1, P_5	
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FIGURE 4. WORKSHEET TO OBTAIN MONTHLY SUMMARIES OF VC ACTION (U)

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inferring their plans. He established the four groups by estimating the amount of VC effort and ordnance expended on the average incident. For example, an action in the fourth group might ordinarily involve a single VC without a weapon, while an action from the third group could involve several VC acting according to a plan and firing on some target. Schwartz' table indicating the estimated expenditure of ordnance and effort for each group is reproduced in Figure 5. A complete listing of the codes and their meanings will be found in Appendix C.

ACTION GROUPS	CODES (CINCPAC)	ESTIMATED EXPENDITURES		ACTION WEIGHTS
		ORDNANCE	EFFORT	
1. Entered and Propagandized	E_1, E_2, E_3 P_1 Through P_5	None	Small (Individuals)	1
2. General Harassment	T_1 Through T_6 M_2 Through M_7 S_1, S_2, H_4	None or Little	Large (Individuals or Subunit)	2
3. Harassing Fire	M_1, M_8, S_3 H_1, H_2, H_3, H_5	Little to Large	Larger (Subunit or Unit)	3
4. Attacked and Ambushed	A_1, A_2, A_3, A_4	Large	Largest (Unit or Units)	10

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FIGURE 5. BASIS FOR ESTABLISHMENT OF ACTION GROUPS: WEIGHTS AND CODES (U)

(C) Also, in Figure 5, weights are assigned to each of the four action groups. Again, these weights are the same as those used by Schwartz in his analysis. The weights were chosen to reflect the intensity of the incidents. Attacks or ambushes are weighted much more heavily than the other actions since they require a considerably greater expenditure of effort. Schwartz points out that "although the individual weights are an estimated measure of the effort for the 'average' incident, adding the weights of incidents for a fixed period of time in a fixed area can be used directly as a measure of the effort expended in the area. The total weight

can also be interpreted as a measure of the importance of that area to the VC at the time selected. Weighting thus provides a way of comparing the amount of VC effort expended from one area to another, and also permits a comparison of changes in VC effort in a given area through time." The weighted totals for each month in the study period of each area were calculated in the worksheets displayed in Appendix B. These sheets permit visual inspection of the action-intensity on a monthly basis for a given area and thus provide a means of visually detecting trends in the activity. They also enable the user to see exactly at which point in time (in terms of months) the change occurred, if there is a change, and thus aid in determining whether the change might possibly be related to defoliation.

(C) However, the weighted totals of the action intensity are not sufficient in themselves to indicate all possible changes in activity that could occur. For instance, a decrease in actions of high intensity occurring at the same time as an increase in actions of low intensity might appear in the weighted totals as a relatively constant level of activity, yet in reality, the change is present and may be significant. In order to detect this type of change as well as changes in the weighted total of actions, it was necessary to calculate other measures. Five such measures were defined, and were calculated for each of the two periods, before defoliation and after defoliation, for each area studied. These five measures are:

(1) The unweighted total number of incidents, "n", for each period

(2) The weighted total number of incidents, "W. T." for each period

(3) The mean, or average, intensity per incident, "μ_I", calculated as "W. T. ÷ n", for each period

(4) The mean intensity per month, "μ_m", calculated as "W. T. ÷ number of months of data", for each period

(5) The average monthly frequency of occurrence of incidents for each period, calculated as "n ÷ number of months of data".

(C) The first two measures, "n" and "W. T.", are meaningful in themselves only when the two data periods, before defoliation and after defoliation, have the same number of months of data available. The third measure, "μ_I", provides a means for detecting changes in the average type of incident occurring in the two periods. However, a change among the three lesser groups of action types is hardly detectable, but a change involving one of these three groups and group four, the ambush or attack category, is quite noticeable in terms of "μ_I". The fourth and fifth measures usually act in a similar fashion. Of the two, the fifth

measure, average frequency "f", was most useful in trying to detect shifts. Considered individually, none of the measures are very meaningful, but when they are considered collectively, in conjunction with graphs of weighted monthly activity, they do provide useful information to detect changes if they are present. The manner in which these techniques can be used to analyze activity in given areas is illustrated below for the eight regions chosen for this study.

(C) Finally, in addition to the above methods for handling the data to determine changes, one other procedure was followed for each area studied. This was to plot the incident data on a grid of the area, using the UTM coordinates provided. This was done to detect any noticeable shift in the geographic location of incidents after defoliation, if such occurs. This was done for each of the regions studied and these plots appear in the section where each region is discussed.

RESULTS OF THE STUDY

Region 1

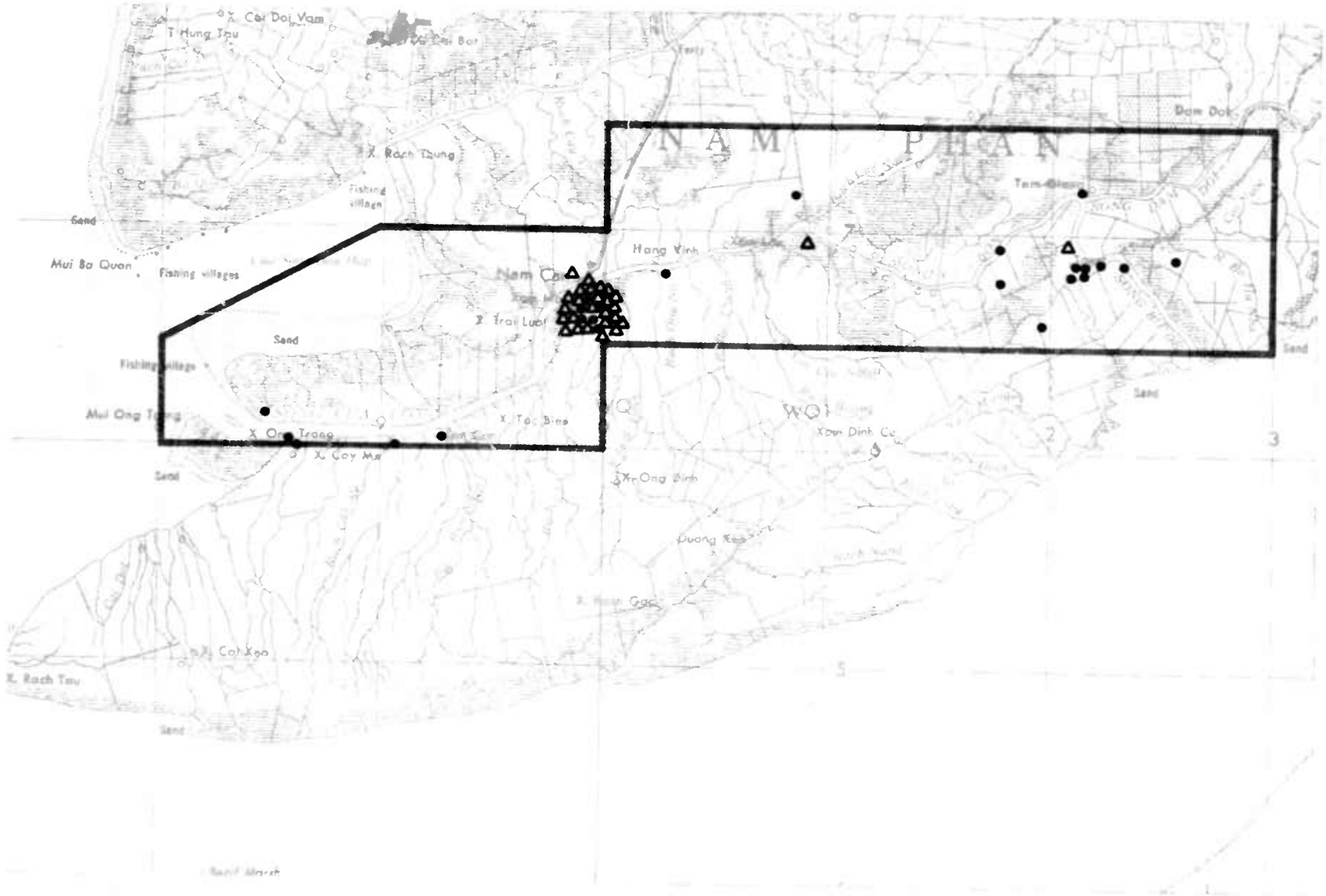
Location and Description

(C) Region 1 is located in the extreme south of Vietnam, in Nam Phan province. The region extends across the peninsula from the Gulf of Siam to the South China Sea and includes the Cua Lon and Bo De Rivers. Figure 6 is a map of the region.

Defoliation

(C) In June, 1963, a total of 1560 hectares was defoliated along the Bo De and Cua Lon Rivers. Coordinates for the defoliated strip are not given but the area corresponds closely to the area of 1600 hectares which was defoliated in 1964 and for which coordinates are given. The coordinates appear to cover the entire length of the rivers so it can be assumed that the 1963 missions also sprayed all forested areas along the rivers.

(C) In August, 1966, 460 hectares along the rivers in the middle of the peninsula were defoliated.



(CONFIDENTIAL)

FIGURE 6. REGION 1, BOUNDARIES AND LOCATION OF VC-INITIATED INCIDENTS (U)

● Before defoliation △ After defoliation

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VC-Initiated Incidents

(C) Incident data are available for only 5 months preceding the initial defoliation in June, 1963. During those months, there were 15 incidents of which 7 were directed at boats in the river. In the next 9 months (including June, 1963) there were only 9 incidents in the region, only 2 of which were directed at boats. Both of the 2 incidents occurred more than 4 months after defoliation. At that time, early February, 1964, the river banks were again defoliated. In the following 12 months, there was an increase in the number of incidents (from 15 to 21) but none of these were directed against boats. The destribution of the incidents by objective type is given in the following tabulation:

	Posts and Military Personnel	Civilian Facilities	Boats
12 Months Before	3	7	5
12 Months After	8	13	0

(CONFIDENTIAL)

(C) There appears to have been a shift in the type of action, from attacks to harassing fire.

	Attacks	Harassment
12 Months Before	10	3
12 Months After	0	19

(CONFIDENTIAL)

(C) Although the number of reported incidents was 53 percent greater in the period following defoliation, the shift in the type of action resulted in a decrease in the intensity measures, from 113 to 61 for the total intensity and from 7.53 to 2.90 for the mean intensity per incident. This is because of the change in the type of action, from attacks to harassment, noted above.

Summary and Conclusions

(C) The defoliation target in Region 1 was the banks of the Bo De and Cua Lon Rivers. There were five actions against boats in the year before defoliation, none in the year following. VC actions showed a change in the region from attacks to harassment, accompanied by a decrease in the mean intensity of the actions. Because there were only 36 incidents in the 2-year period, these results should be taken as indications of possible defoliation effects, but no firm conclusions can be drawn.

Region 2

Location and Description

(C) Region 2 lies along the southeast coast of Vietnam from about 9°N to 9°45'N and includes the mouth of the Bassac River. There are no sizable towns in the region although Binh Loi lies just outside of it. Only small parts of important roads lie in the area. Figure 7, Parts I and II, is a map of the region.

Defoliation

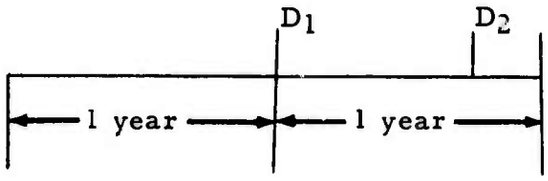
(C) The first defoliation missions in the region were carried out in May, 1965, when approximately 45,000 hectares were sprayed, covering nearly the entire length of coastline. In January, 1966, 7400 hectares were sprayed; this was mostly respraying of areas covered in 1965. An additional 1200 hectares were sprayed in April, 1966, and 500 hectares in June, 1966.

VC-Initiated Incidents

(C) The analyses of data for Region 2 are complicated because two major defoliation tasks were performed only 8 months apart and because pronounced seasonal effects are evident. They are shown in Figure 8. There are peaks of VC activity in June and December. Since the defoliation programs in this region were carried out in May and January, just before and just after the peaks, a decline in VC activity starting 2 or 3 months after these dates would be expected whether there was defoliation or not.

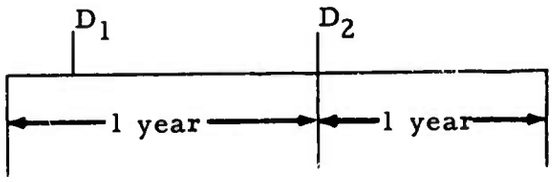
(C) At present, no method for removing the seasonal effects is available and so it seems best to separate the two defoliation sets completely. By considering 1-year periods before and after defoliation, any positive effects should be enhanced in one case and maintained over a longer period in the other.

(C) In the first case, the defoliation will be followed by a second defoliation 9 months later.



At that time, some regrowth is likely and the second defoliation should aid in keeping any possible effects more constant throughout the 1-year period.

(C) In the second case, the initial period contains the aftermath of the first defoliation.



It might be expected, therefore, that the incident characteristics in the second period would be similar to those in the first.

(C) We begin by examining the effects of the first defoliation and looking at two periods of 12 months each, one on either side of the defoliation date. The objectives of the actions fall into three groups as is shown in the following tabulation.

Number of Incidents, Region 2 (U)

First Defoliation

Objective Group	Before	After
Roads	26	56
Civilians	9	43
	35	99
Civilian Facilities	72	33
Military Units	16	9
Other	16	15
	104	57
Military Facilities	123	118
TOTAL	262	274

(CONFIDENTIAL)

(C) In addition to the counts shown, there were 32 incidents involving aircraft. These all fell in the last 5 months of the period after defoliation.

(C) The total number of incidents before and after were nearly identical, 262 and 274, respectively, exclusive of aircraft incidents, but there were significant changes in the counts among the various objective groups. The number for

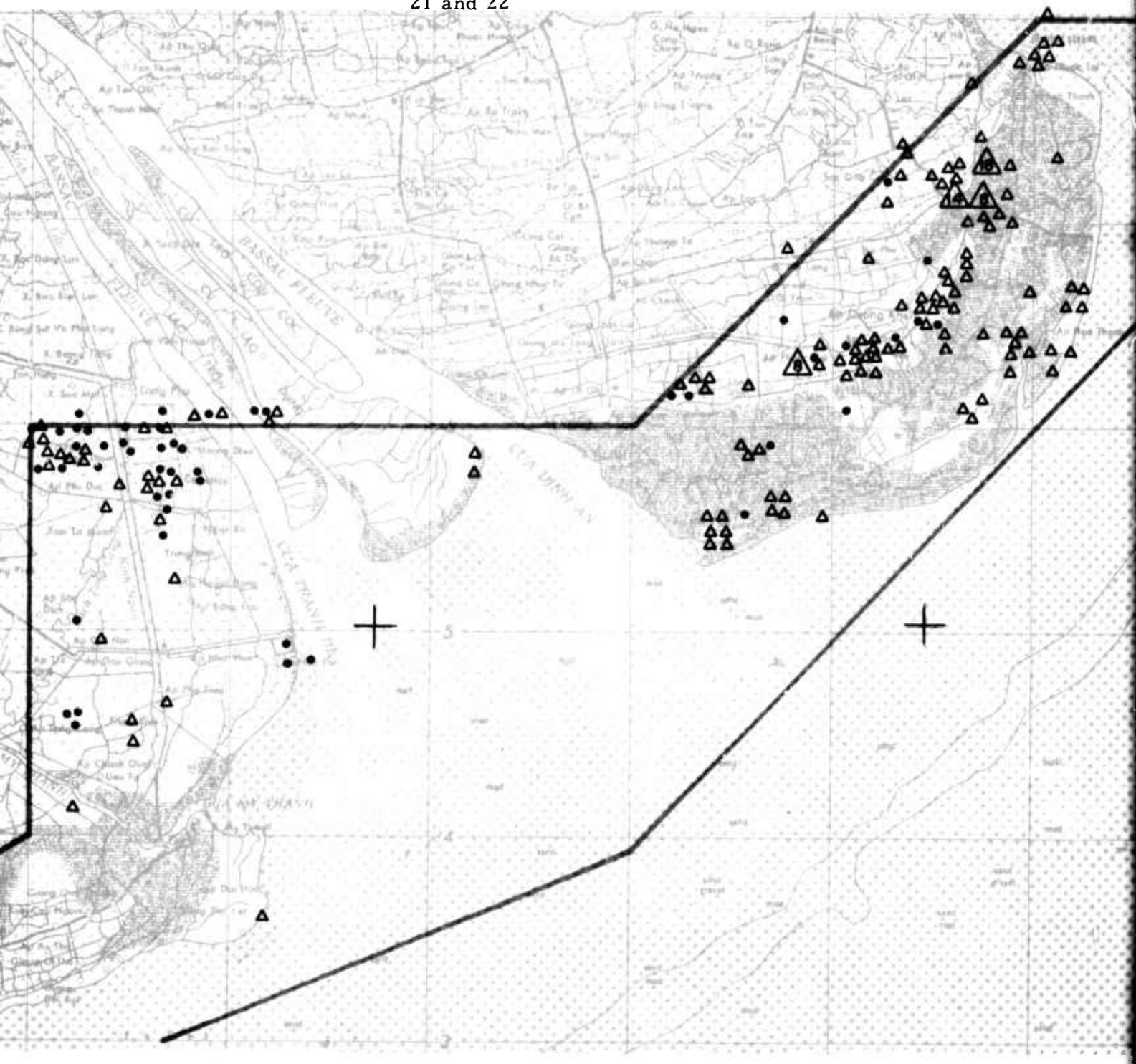


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FIGURE 7. PART I. REGION 2, BOUNDARIES AND LOCATION OF VC-INITIATED INCIDENTS (U)

● Before defoliotion △ After defoliation

Enclosed numbers indicate multiple incidents ot the point.

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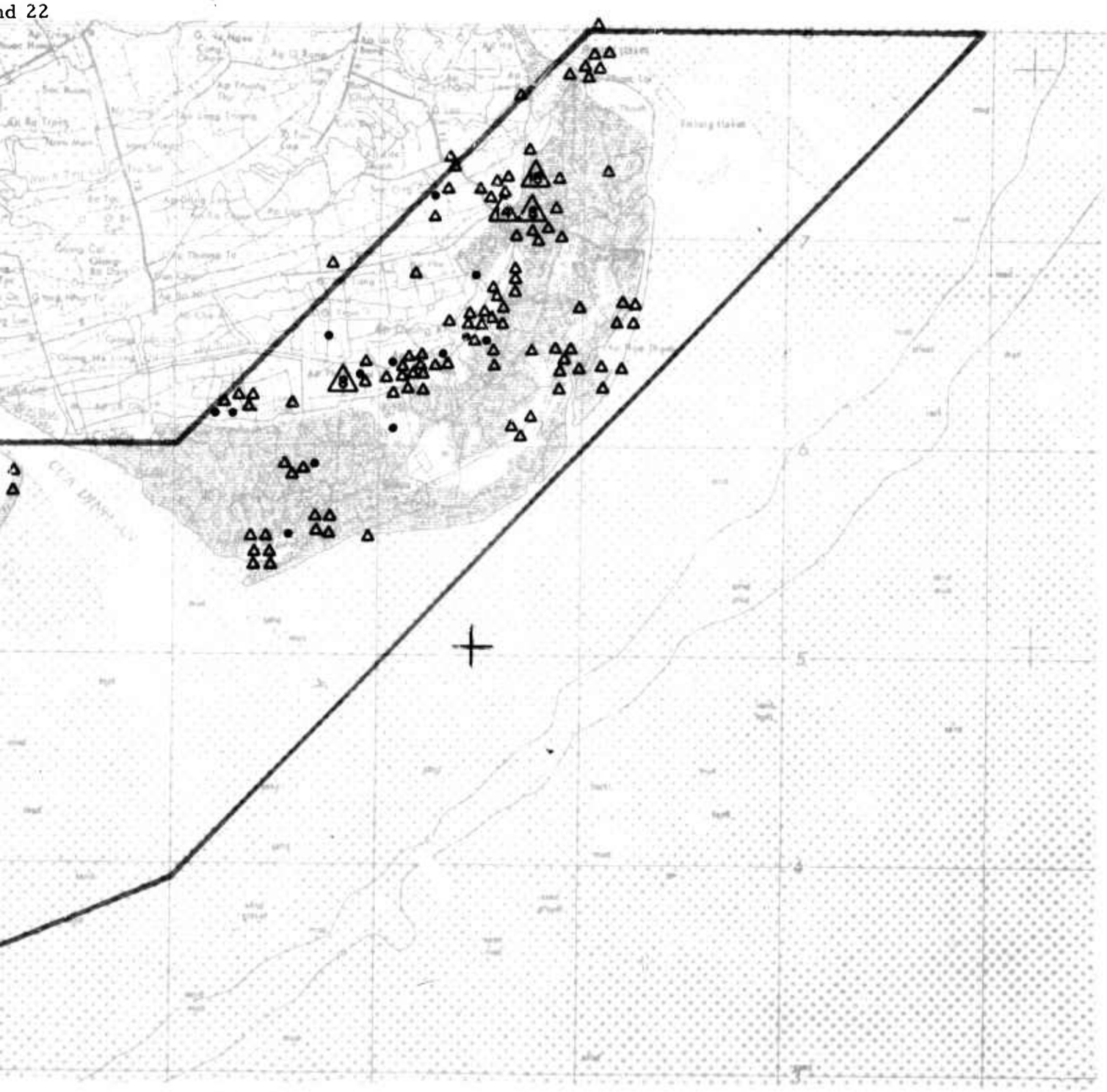

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BOUNDARIES AND LOCATION OF
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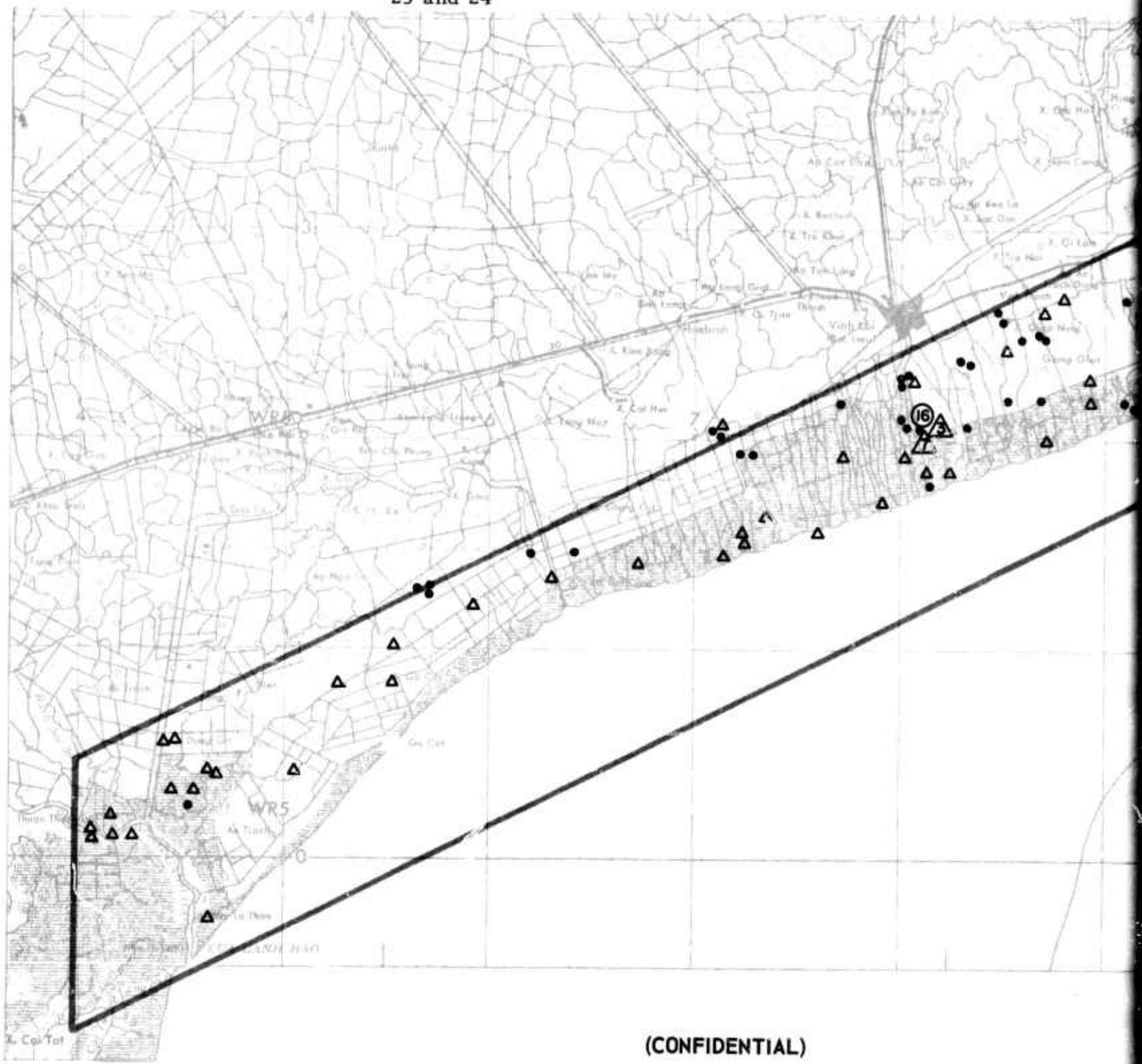

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FIGURE 7, PART II. REGION 2, BOUNDARIES AND LOCATION OF VC-INITIATED INCIDENTS (U)

● Before defoliation △ After defoliation
Enclosed numbers indicate multiple incidents at the point.

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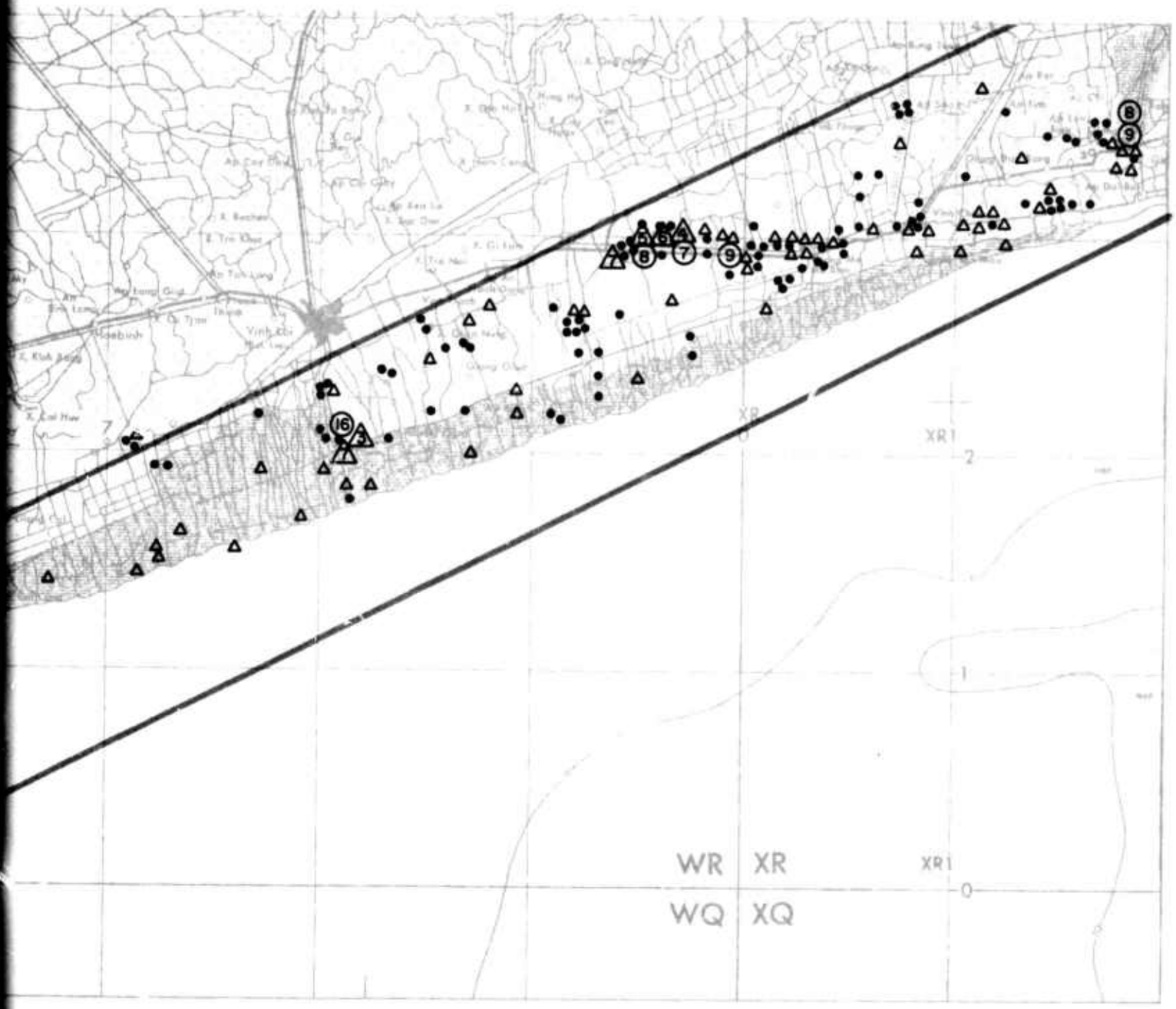

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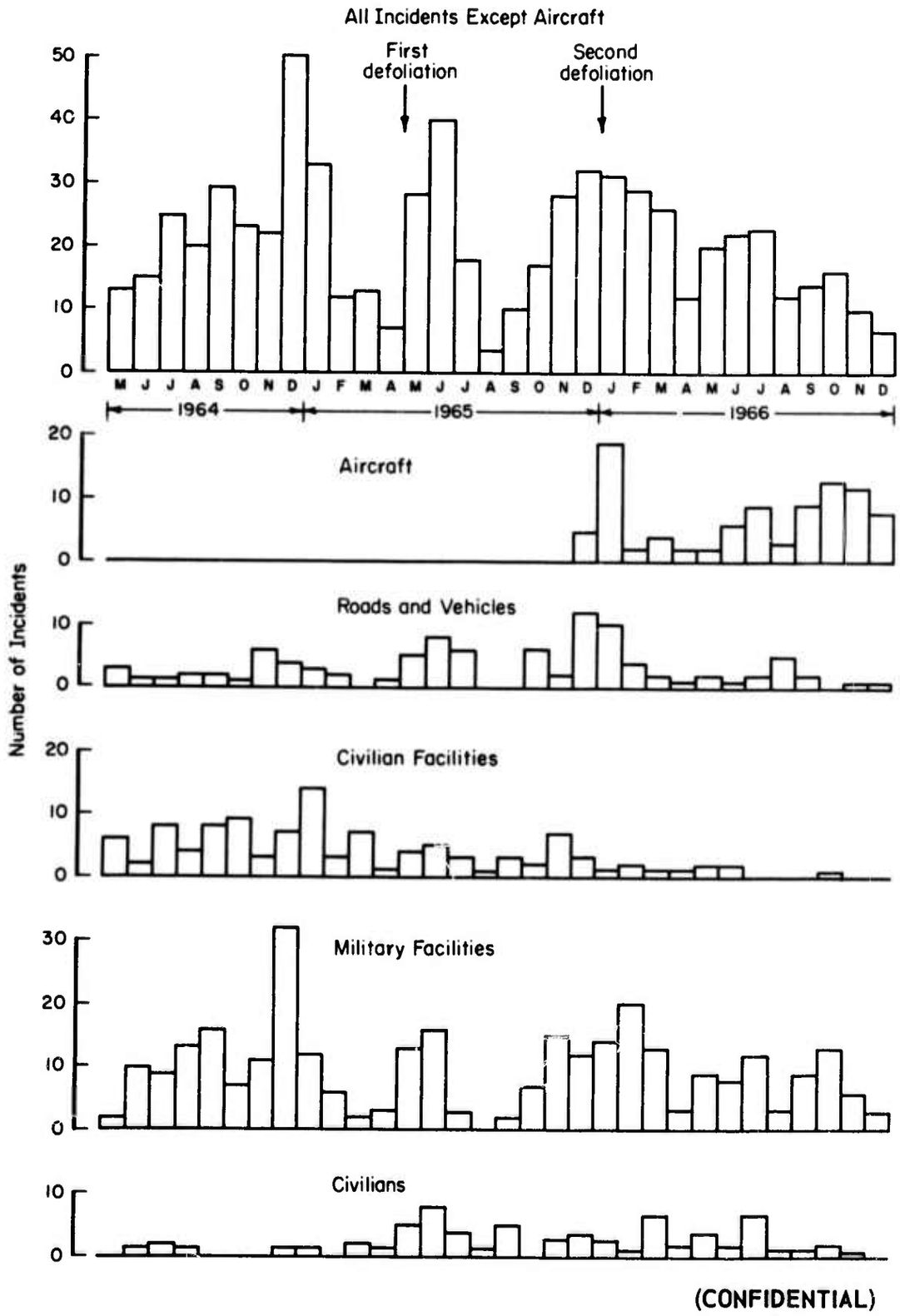


FIGURE 8. REGION 2, INCIDENT DISTRIBUTIONS (U)

two of the groups, roads and civilians, increased significantly, i. e., the number of incidents involving roads and vehicles doubled, and the number involving civilians multiplied by a factor of five. Most of the incidents involving civilians consisted of entries into villages and hamlets and included a number of kidnappings. The count for the roads group may be misleading. Month-by-month counts show (Figure 8) that the general level of incidents in this group continued at the same rate after defoliation as before, with 22 of the total of 56 occurring in a 2-month span, December, 1965, and January, 1966. There was probably an increase in the incident rate but not as large as might first be thought. Actions against civilians, on the other hand, increased after defoliation and held at a fairly constant level.

(C) Two objective groups decreased in incident count. The incidents for military units declined from a total of 16 to 9. Because the totals are not very high, considering that each figure is for a 12-month period, this may not be too significant. The second group, civilian facilities, averaged about six incidents per month before defoliation and only three afterwards, an overall decrease of 55 percent. The incidents were mainly in the nature of harassing fire, frequently by mortars. As an aside it is interesting to note that if actions against civilians and civilian facilities are combined, then the number of incidents directly involving civilians remained relatively constant, 81 before and 76 after.

(C) The third objective group, military facilities, had nearly the same incident counts before and after, 123 and 118, respectively, with the distributions showing only the expected seasonal effect.

(C) Taken together, the only possible effects of the defoliation appear to have been to cause a shift away from the larger objectives such as hamlets and villages and toward individual civilians and road blocks.

(C) Indicators of the VC activity may have decreased slightly because of changes in the type of attack in spite of an overall increase in the number of actions. If actions against aircraft are included, the decrease is 10 percent for μ_I (2.97 to 2.66); if actions against aircraft are excluded, the decrease is 12 percent (2.97 to 2.62).

(C) Now, consider the second defoliation in January, 1966, again comparing 1-year periods before and after defoliation. The period before defoliation includes 4 months (January – April, 1965) before any defoliation and 8 months (May – December, 1965) following the first defoliation. It might be expected, therefore, that any changes in VC objectives caused by the first defoliation would be continued by the second. This was found to be generally true.

Number of Incidents, Region 2 (U)

Second Defoliation

Objective Group	Before	After
Roads	45	31
Civilians	34	31
	79	62
Civilian Facilities	53	10
Military Units	8	25
Other	10	16
	71	51
Military Facilities	91	113
TOTAL	241	226

(CONFIDENTIAL)

(C) After the first defoliation, actions against roads doubled and actions against civilians increased by a factor of 5; after the second, actions against roads decreased 31 percent (a reversal) and actions against civilians remained nearly constant. After the first defoliation, actions against civilian facilities were halved; after the second, they decreased even more (by 81 percent). There may have been some increase in actions against military facilities after the second defoliation but it was not great.

(C) There was very little change in the mean intensity measure, μ_I. The change amounts to an increase of only 11 percent (2.61 to 2.92) when aircraft incidents are included and 10 percent (2.65 to 2.91) when they are excluded.

(C) For a final comparison, we may compare the incidents in the year before any defoliation with the incidents in the year following the second defoliation.

Number of Incidents, Region 2 (U)

Objective Group	Before First Defoliation	After Second Defoliation
Roads	26	31
Civilians	9	31
Civilian Facilities	72	10
Military Units	16	25
Military Facilities	123	113
Other	16	16
TOTAL	262	226
Aircraft	0	89

(CONFIDENTIAL)

(C) The number of incidents against roads was nearly the same as it was before any defoliation. The upsurge in incidents in that category between sprayings cannot be explained in terms of defoliation effects. There appears to have been an increase in incidents against civilians and there was a very definite decrease in incidents against civilian facilities. The number of incidents against aircraft shows that there was increased air activity in the region following the second defoliation, which may have influenced VC activity more than any defoliation effects. During the same periods there was only a slight increase in the incident intensity as measured by the Schwartz method.

Summary and Conclusions

(C) Region 2 lies along the southeast coast of Vietnam. Extensive spraying of the area was done in May, 1965, and again in January, 1966. Comparison of the 1-year periods before the first, and after the second, defoliation shows that there was a significant (86 percent) decrease in actions against civilian facilities. That there was also increased air activity in the region after the second defoliation is shown by the fact that there were 89 incidents involving aircraft after the second defoliation, none before the first. This may have partly accounted for the decreased VC actions against civilian facilities. Incident counts against other VC objectives were essentially unchanged. There were seasonal peaks of VC activity in December and July.

Region 3

Location and Description

(C) Region 3 lies in part of the Mekong Delta. The principal features in the region are the Ba Lai River and a wooded area along the coast. No major towns are in the region although My Tho and Truc Giang are just to the west. Figure 9 is a map of the region.

Defoliation

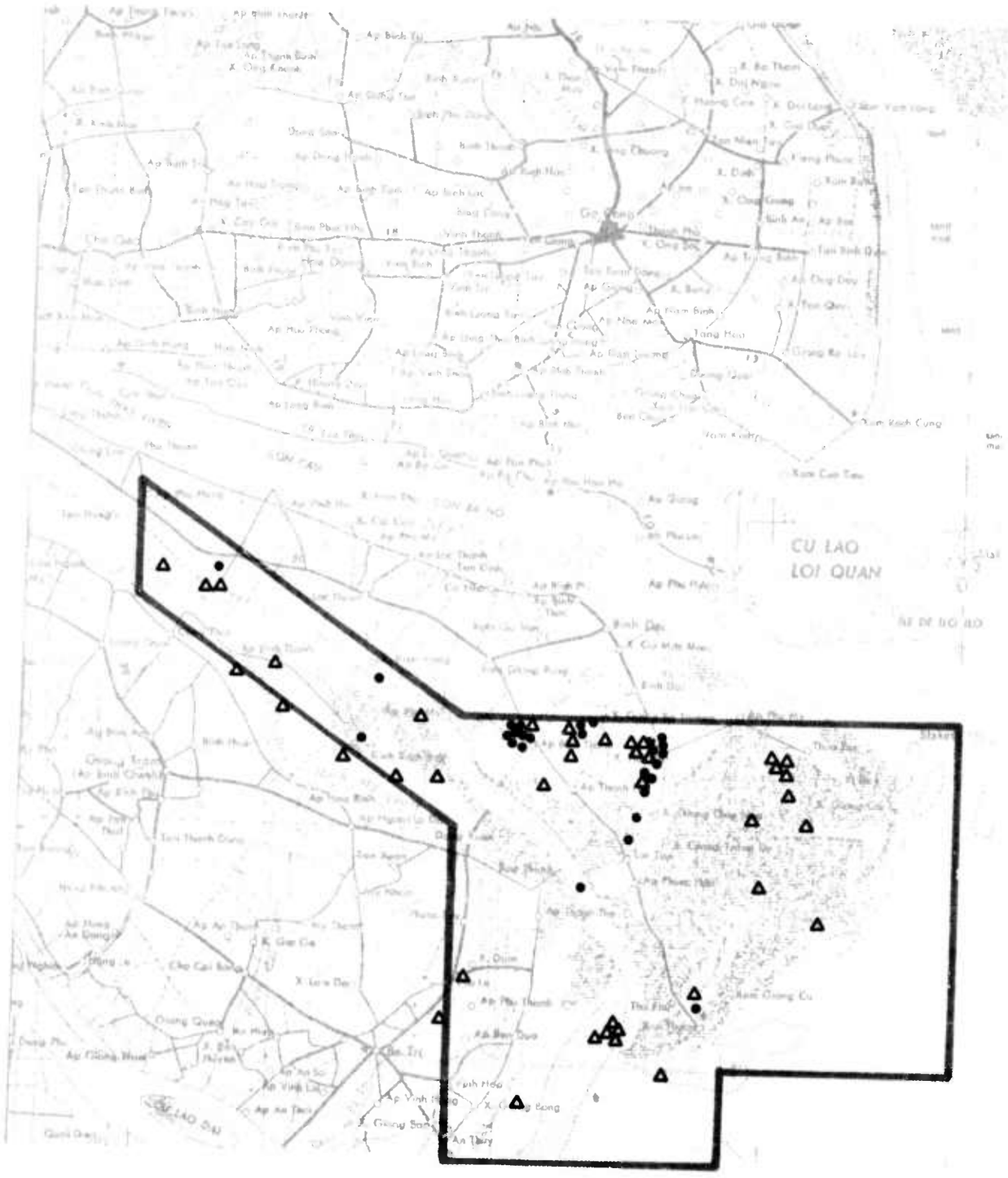
(C) Defoliation missions were first made in the region during December, 1965, when nearly 7,000 hectares were sprayed. The area sprayed extended from coordinate XS635315 southeast along the river to its mouth and then southwest along the coast to the island at YS810030. In June, 1966, a respraying of 155 hectares along the coast was done as part of a program begun in April of that year to defoliate the peninsula lying between the Song Ba Lai and the Song Cua Dai. In that sequence of missions 1,750 hectares were sprayed.

VC-Initiated Incidents

(C) During the 12 months preceding defoliation there were a total of 31 VC-initiated incidents in Region 3. They were nearly equally divided between incidents directed toward military installations (13 incidents) and incidents directed toward civilian facilities (11 incidents). The remaining seven incidents were scattered among four objective groups.

(C) After defoliation, the number of incidents against posts remained nearly the same, 15 incidents as against 13 before. Two objective groups showed marked changes. The first, where the incident objectives were civilian installations dropped from 11 to 2, each for a 12-month period. On the other hand, incidents involving aircraft jumped from zero to 18. Overall, the net change in incidents increased from 31 to 43. If the incidents involving aircraft are neglected, there was a decrease of 19 percent in the number of incidents, due almost entirely to the lesser number of incidents against civilian installations.

(C) Both before and after defoliation the majority of incidents were of the harassing-fire type so that the weighted totals increased after defoliation due to the increased number of incidents. However, μ_I, the mean intensity per incident decreased from 3.71 to 3.07 (17 percent) because there were four attacks before and only one attack after defoliation. Attacks carry a weight of 10 in the Schwartz weighting scheme.



(CONFIDENTIAL)

FIGURE 9. REGION 3, BOUNDARIES AND LOCATION OF VC-INITIATED INCIDENTS (U)

● Before defoliation △ After defoliation
Enclosed numbers indicate multiple incidents at the point.

(C) Because the spraying which was done in December, 1965, and in June, 1966, covered two different parts of Region 3, it was felt that the first spraying might have caused a shift of incidents from that part of the region into the other. Counts of incidents for each part of the region did not detect any such shift, possibly because the first section, 3A, had most of the incidents both before and after defoliation (77 percent of the total) and the count in the second section, 3B, was too low to be very significant. There were only 15 incidents in the second region, ten of these coming after the first region was defoliated. All ten involved aircraft.

Summary and Conclusions

(C) Region 3 lies in the Mekong Delta and includes the Ba Lai River. During the year after defoliation there was a decrease (11 vs 2) in incidents involving civilian installations. Incidents against military installations remained nearly constant (13 vs 15) and increased in activity as indicated by the sudden appearance of incidents involving aircraft (0 vs 18). There may have been some effect of defoliation but the total number of incidents is not high and the indications are not conclusive.

Region 4

Location and Description

(C) Region 4 is a rather small region, 14 km long and 3 km wide, between the Co Chien and Ham Luong Rivers, which form part of the Mekong Delta. The region includes the town of Ma Cay, and its principal feature is the road joining Ma Cay and Truc Giang. Figure 10 is a map of the region.

Defoliation

(C) A few hectares (11) were defoliated by hand spraying in October, 1965, but the majority of the spraying was done in December of that year when 20 more hectares were hand sprayed and 789 were sprayed by aircraft. Spraying was carried out along the highway.

VC-Initiated Incidents

(C) The distribution of the incident counts within the objective groups which accounted for the majority of incidents are shown in the tabulation below.

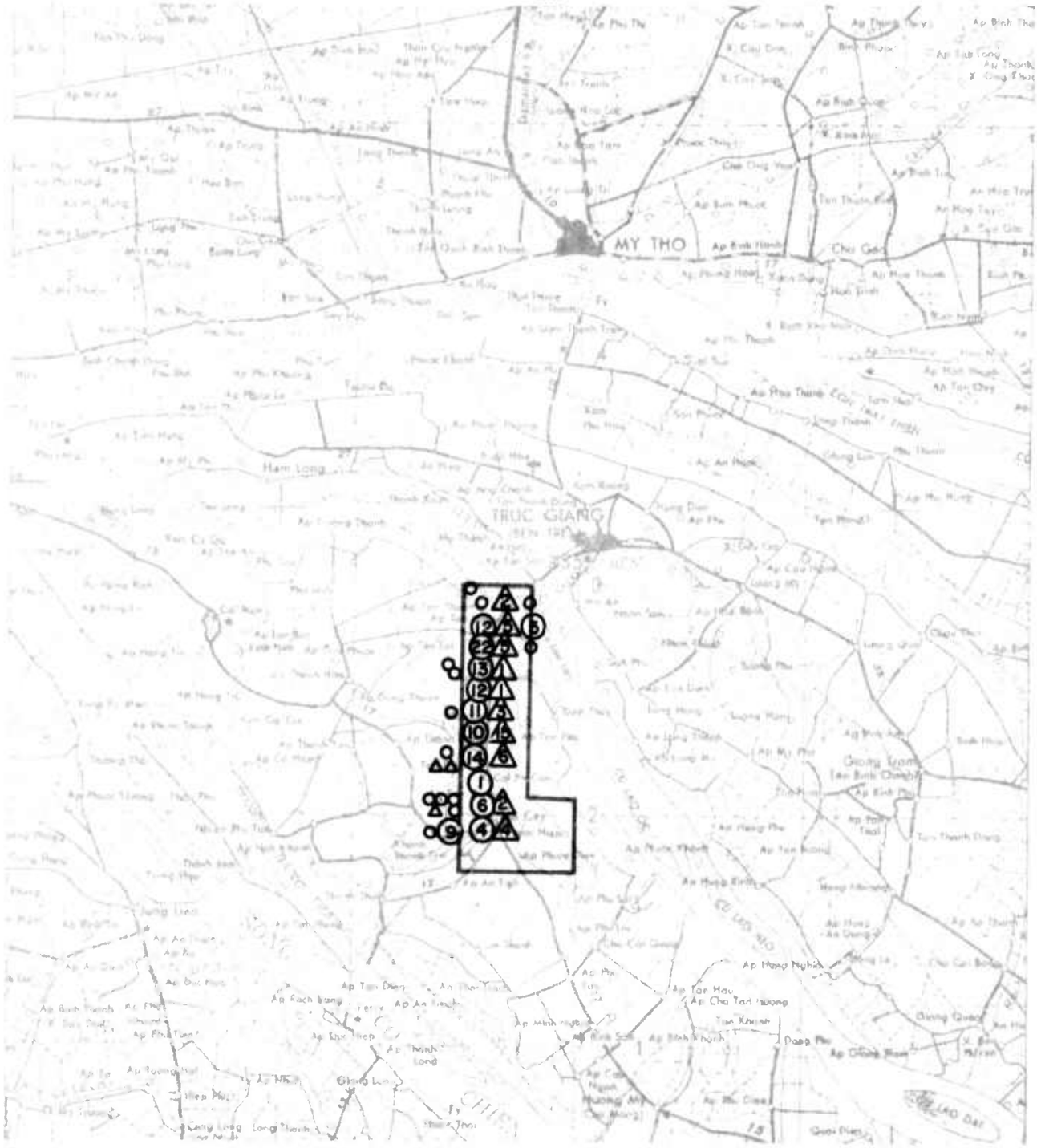


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FIGURE 10. REGION 4, BOUNDARIES AND LOCATION OF VC-INITIATED INCIDENTS (U)

● Before defoliation △ After defoliation

Enclosed numbers indicate multiple incidents at the point.

	Before		After	
	Mined, Harrassed[a]	Other	Mined, Harrassed	Other
Roads	34	5	6	1
Military Facilities	56	5	27	1
Civilian Facilities	18	1	0	0
Military Units	18	0	3	0
Other	8	0	6	2
	134	11	42	4

(CONFIDENTIAL)

(a) Included action codes for: mined, booby trapped, sabotaged with explosives, aggregated harassments, harassing, fire on, bombed, fired on.

(C) It is clear from the tabulation that there was a significant decrease of about 68 percent in VC-initiated incidents following defoliation. Comparisons of the effort directed toward each type of target are more readily made by examination of the percentage of the total incidents directed toward each objective type. These are shown in the second tabulation (in percent).

	Before		After	
	Mined, Harrassed	Other	Mined, Harrassed	Other
Roads	23.4	3.5	13.0	2.2
Military Facilities	38.6	3.5	58.7	2.2
Civilian Facilities	12.4	0.7	0.0	0.0
Military Units	12.4	0.0	6.5	0.0
Other	5.5	0.0	13.0	4.4
	92.3	7.7	91.2	8.8

(CONFIDENTIAL)

(C) Both before and after defoliation the general type of VC action consisted of harassing fire, about 92 percent of all actions. However, there was a definite shift in emphasis toward military facilities (38.6 to 58.7 percent) and away from roads (23.4 to 13.0 percent), civilian facilities (12.4 to 0 percent), and military units (12.4 to 6.5 percent).

(C) The mean intensity per incident, μ_I, increased slightly (8 percent) following defoliation but such a small change, coupled with the greatly decreased number of incidents, shows that there was a significant decrease in activity.

(C) To examine the mining and harassing fire more closely another tabulation was made in which the two types of action, mining and harassing fire, were separated (in percent).

	Before		After	
	Mining	Harassing Fire	Mining	Harassing Fire
Roads	23.5	0.0	10.8	2.2
Military Facilities	0.0	38.6	0.0	58.7
Civilian Facilities	0.0	12.4	0.0	0.0
Military Units	6.2	6.2	2.2	4.4
Other	5.5		13.0	

(CONFIDENTIAL)

(C) Actions against roads were nearly all in the category of mining and did not decline nearly as much as the general trend in the area, probably because such acts were performed during the hours of darkness when the defoliation, or lack of it, would not make much difference in accessibility of the road.

(C) The principal point of interest in the tabulation is the shift of harassing fire from civilian facilities (NRL hamlets, villages) to military facilities (outposts, watchtowers). A month-by-month listing of the incident data shows that the shift away from civilian facilities and military units was abrupt, following defoliation, Figure 11. It must be noted, however, that the results should be interpreted with caution because of the small number of incidents in these groups.

Summary and Conclusions

(C) Prior to defoliation this region was one of heavy VC-initiated activity. Following defoliation there was a decrease of 68 percent in the number of incidents for the 12 months before to the 12 months following defoliation. During both periods mining of roads and harassing fire on military facilities accounted for 92 percent of the incidents. After defoliation there was an abrupt shift in VC targeting toward military facilities and away from other objectives. The weighted total, W. T., of the incidents decreased from 432 to 150, a decrease of 65 percent.

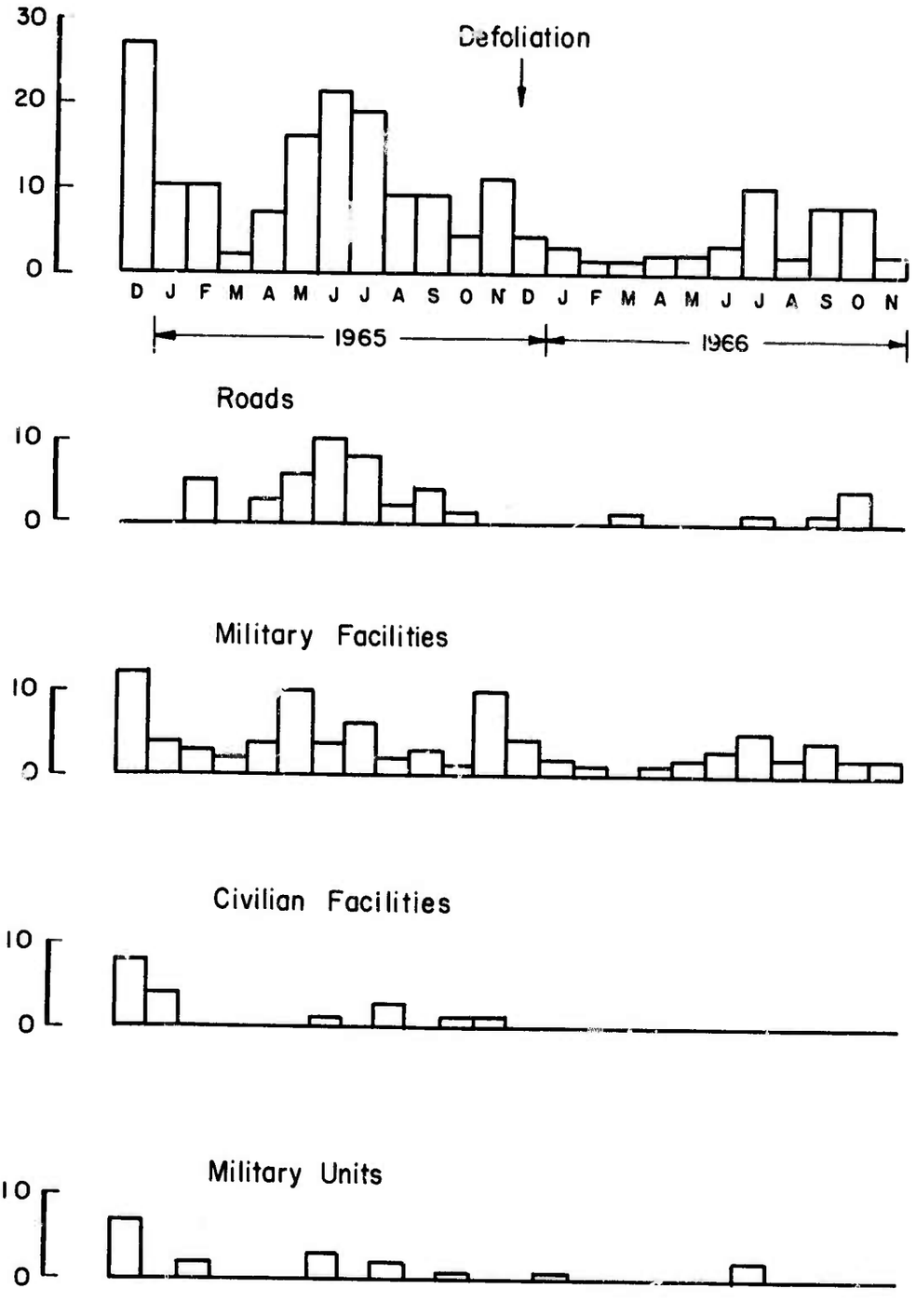

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FIGURE 11. REGION 4, INCIDENT DISTRIBUTIONS (U)

Region 5

Location and Description

(C) Region 5 is located about 40 km to the south of Saigon, between the Vaico and Cua Tieu Rivers. The principal town in the region is Go Cong. Highways run from that town north to Saigon and west to My Tho. The region is about 15 x 25 km in size and had a high level of activity. Figure 12 is a map of the region.

Defoliation

(C) The defoliation tasks in this region were carried out by hand spraying. The areas sprayed ranged in size from 1 to 13 hectares. Data for 31 spraying tasks, extending from February to November, 1965, were available.

VC-Initiated Incidents

(C) A detailed study was made of Region 5 to determine whether there were any differences in frequency of incidents between similar types of places, some of which had been defoliated and some of which had not.

(C) A listing of all incidents within the area for the years 1963 through June, 1966, was obtained. A diagram of frequency by months is given in Figure 13. The number of incidents per month increased steadily to a peak in September of 1964, after which they began to decline. The decline continued until June of 1966, the last month for which data were available, except for a period of intense activity during December, 1965.

(C) The distribution of incidents with respect to the type of objective and the type of action for the 4 years is shown in Table 2.

(C) In this area actions against roads and military posts comprised 85 percent of the total. More than half of the actions against posts were harrassments; most of the actions against roads were in the sabotage category. These consisted principally of blockages of the roads.

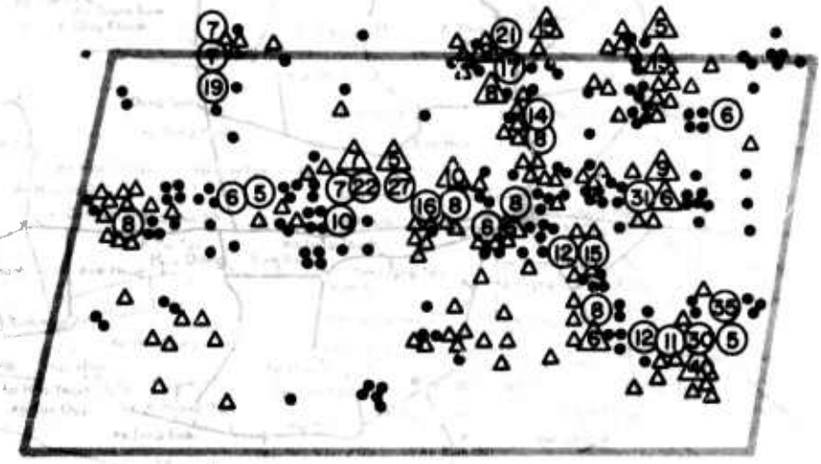

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FIGURE 12. REGION 5, BOUNDARIES AND LOCATION OF VC-INITIATED INCIDENTS (U)

● Before defoliation △ After defoliation
Enclosed numbers indicate multiple incidents at the point.

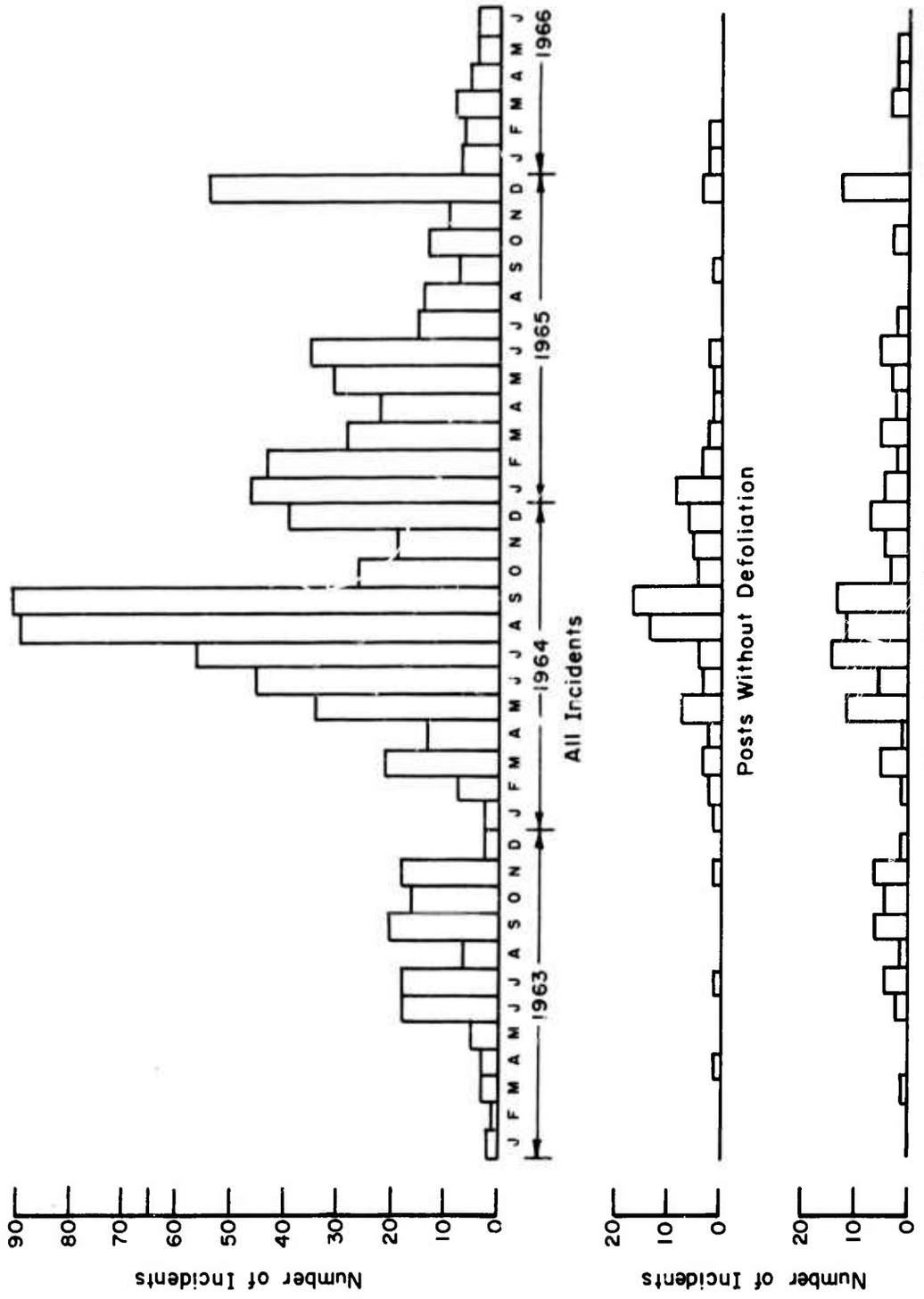


FIGURE 13. REGION 5, DISTRIBUTION OF INCIDENTS AGAINST POSTS WITH AND WITHOUT DEFOLIATION (U)

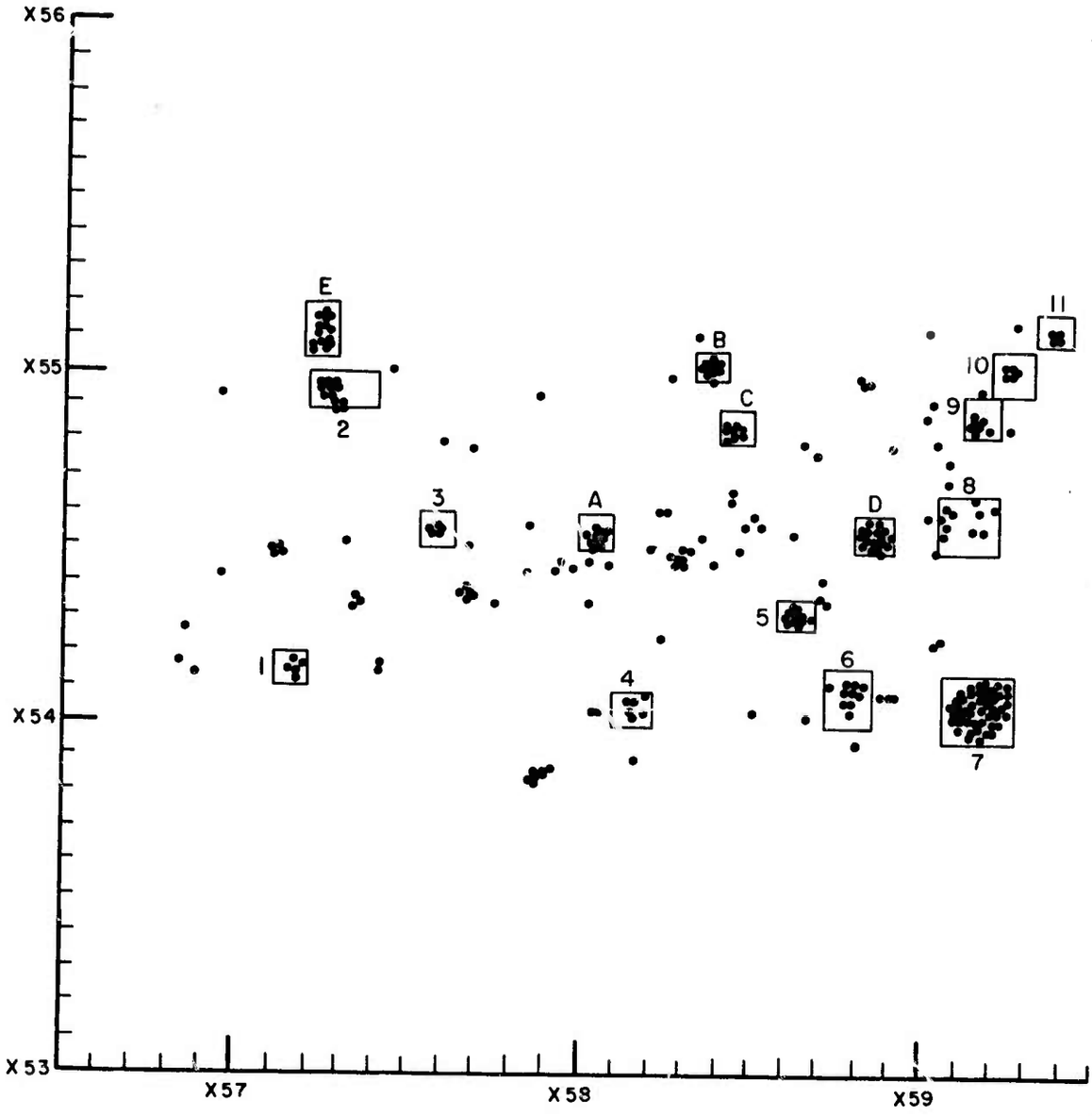
(CONFIDENTIAL)

TABLE 2. DISTRIBUTION OF INCIDENTS IN REGION 5 FOR THE YEARS 1963 THROUGH 1966 (U)

	Attacks	Harrassment	Mining, Stopping, Blocking, Destruction	Sabotage	Terrorism	Entering and Propagandizing	Total
Vehicles	1	8	19	--	--	--	28
Roads and bridges	--	--	45	290	--	1	336
Military posts	46	288	2	--	--	--	336
Hamlets and villages	15	51	9	1	--	1	77
Military Personnel	12	45	7	--	19	1	84
Civilians	--	5	1	--	20	1	27
Miscellaneous	--	8	9	2	--	--	19
Total	74	405	99	293	39	4	907

(CONFIDENTIAL)

(C) By comparison of the comments on the incidents list and on the defoliation data sheets, it was possible to identify 11 posts where defoliation missions had been carried out and five where no defoliation was performed. The locations of these posts are shown in Figure 14. Lettered rectangles show locations where there was no defoliation, numbered rectangles show locations where there was defoliation. In the figure, each dot represents an incident. Where more than one incident was reported at a single coordinate, separate dots were placed on the map to indicate the intensity at the point. Only those actions occurring at one of the identified posts and which are paired with one of the following objective codes were counted: 10, a military post; 11, an outpost; 12, a base; 13, a junk base; 15, a watchtower; 16, a blockhouse; 17, military facilities. The incidents for each type of subarea were counted month by month, and the graphs of monthly results are shown in Figure 13. It can be seen that the rate of incidents involving the military posts follows the same pattern as the general pattern, that is, a steady rise to September, 1964, followed by a fairly steady decline. No effect of defoliation on the number of incidents can be seen; in fact, the number of incidents at the non-defoliated facilities decreased by a larger percentage than did the number of incidents at the defoliated facilities as shown in the following tabulation.



(CONFIDENTIAL)

FIGURE 14. LOCATION OF INCIDENTS AT POSTS, OUTPOSTS, BASES, WATCHTOWERS, BLOCKHOUSES, AND MILITARY FACILITIES (U)

Multiple incidents at a point are plotted adjacent to the point to indicate the intensity.

Lettered rectangles show locations where no defoliation was performed.

Numbered rectangles show locations where defoliation was performed.

	Before Defoliation 3/64 to 2/65	After Defoliation 3/65 to 2/66	Percent Change
Defoliated Posts	80	32	-60
Nondefoliated Posts	74	14	-81
Unidentified Posts	41	22	-46
	195	68	-65

(CONFIDENTIAL)

Summary and Conclusions

(C) Eleven posts where there had been defoliation and five where there had been none were identified in Region 5. The number of incidents at the two types of posts and within the region as a whole followed the same general pattern, a steady rise to a peak in September, 1964, followed by a steady decrease. There is no evidence that defoliation in the vicinity of military posts resulted in a decreased number of attacks and harassments against the posts since the number of incidents at the nondefoliated posts decreased by a larger percentage than did the number of incidents at the defoliated posts.

Region 6

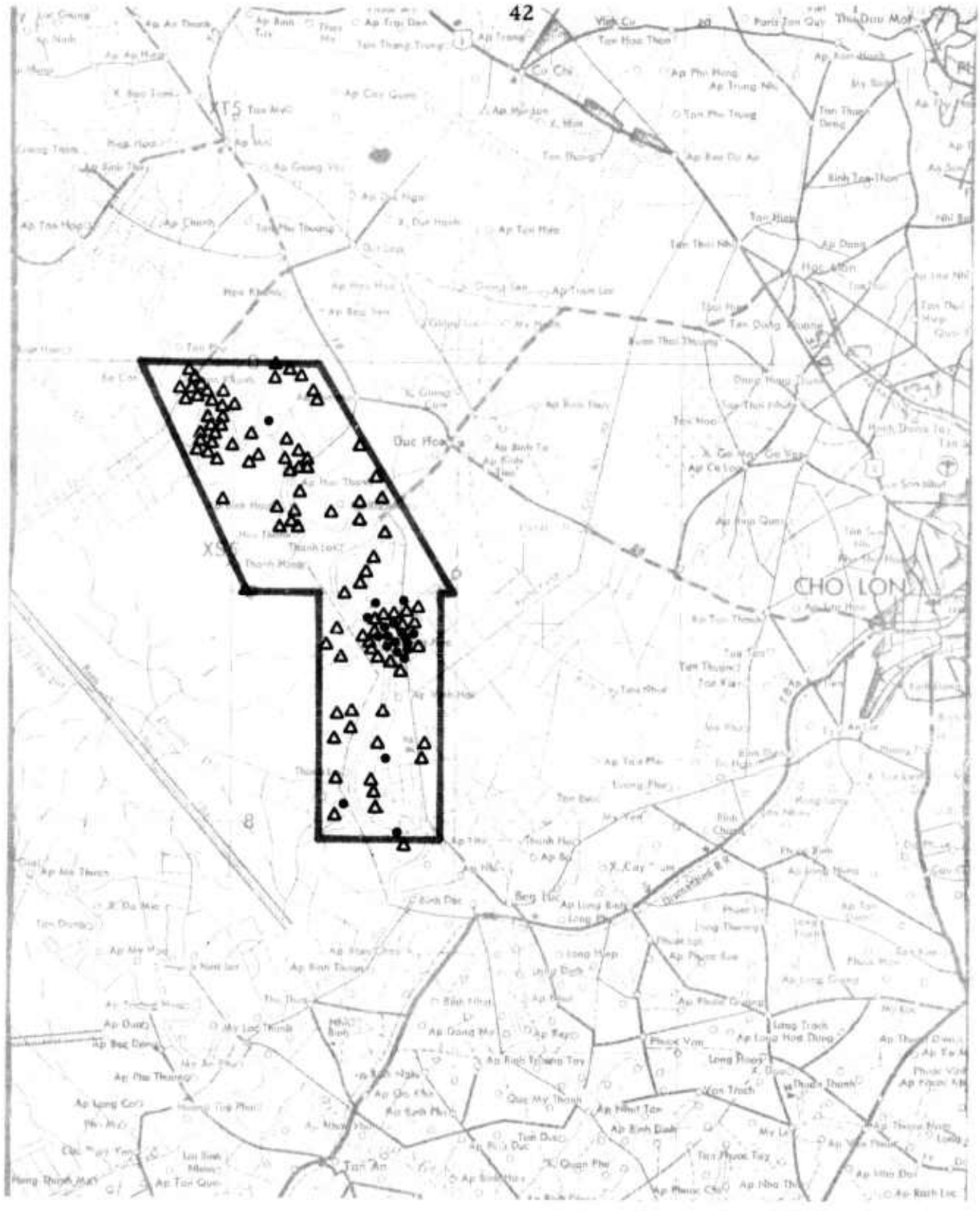
Location and Description

(C) Region 6 is located about 20 km to the west of Saigon. The region is approximately 25 km long on a north-south line and includes a section of the Vaico Oriental River. Figure 15 is a map of the region.

Defoliation

(C) The first defoliation in this region was in January, 1965, when 315 hectares at the northern end of the region were sprayed. Spraying of a larger area was done in November and December, 1965, when the river banks were sprayed between the coordinates XS477982 and XS555798. The Evaluation of Defoliation Operation (Raymond J. Lawler, Captain ACC, to Commander, U.S.M.A.C.V., 28 March 1966) states that the spraying effectively reduced the concealment in most of the target area. Spray operations in the following areas were not considered adequate since visibility was not improved to the desired degree (80-90 percent);

West bank of river, XS486970 to XS487965
South bank of river, XS493961 to XS501960



(CONFIDENTIAL)

FIGURE 15. REGION 6, BOUNDARIES AND LOCATION OF VC-INITIATED INCIDENTS (U)

● Before defoliation △ After defoliation

West bank of river, XS520962 to XS523958
West bank of river, XS523950 to XS522942
South bank of river, XS527932 to XS531930.

VC-Initiated Incidents

(C) During the 12 months preceding defoliation there were 25 incidents in the region, in the 12 months following, there were 84, an increase of 59 incidents. A breakdown of the incidents by objective type is given in the tabulation.

	Number		Percentage	
	Before	After	Before	After
Military Facilities	14	9	56.0	10.7
Military Units	7	28	28.0	33.3
Aircraft	0	41	0.0	48.8
All Other	4	6	16.0	7.2
	25	84	100.0	100.0

(CONFIDENTIAL)

(C) It is apparent from examination of the tabulation that either there was increased VC presence or increased friendly forces presence in the region after defoliation, probably the latter. Before defoliation there were no incidents involving aircraft and only seven against military units over the 12-month period. In the year following defoliation, however, there were 41 actions against aircraft and 28 against military units. It is because of the increases in the number of incidents against these two objective types which caused the weighted incident count to rise from 74 to 251, more than a threefold increase, although the mean incident intensity, μ_I, remained constant (2.96 before, 2.99 after).

(C) The only other type of objective with a significant number of incidents is that of military facilities, 14 before and 9 after.

(C) By excluding actions against military personnel and aircraft, two objective groups in which conditions appear to have been changed from before to after defoliation, we can look for changes in actions against other types of objectives. When these categories were eliminated it was found that the number of incidents before and after were 18 and 15, respectively, with no change in the mean intensity. Because of the low incident counts, it is doubtful if there is much significance to the change.

(C) The defoliation target in this region was the river bank. Since there was only one incident involving boats before defoliation and two afterwards, no possible effect of defoliation on river security can be seen.

Summary and Conclusions

(C) The banks of the Vaico Oriental River were defoliated beginning in November, 1965. The large increase in incidents for the 12 months following defoliation as compared with the 12 months before was due to increase air activity and incidents involving military personnel. Other objective categories remained unchanged. The reuslts contradict the statement in the defoliation evaluation report that "the Viet Cong incident rate has decreased in the defoliation area".

(C) In this region defoliation had no detectable effect on VC activity.

Region 7

Location and Description

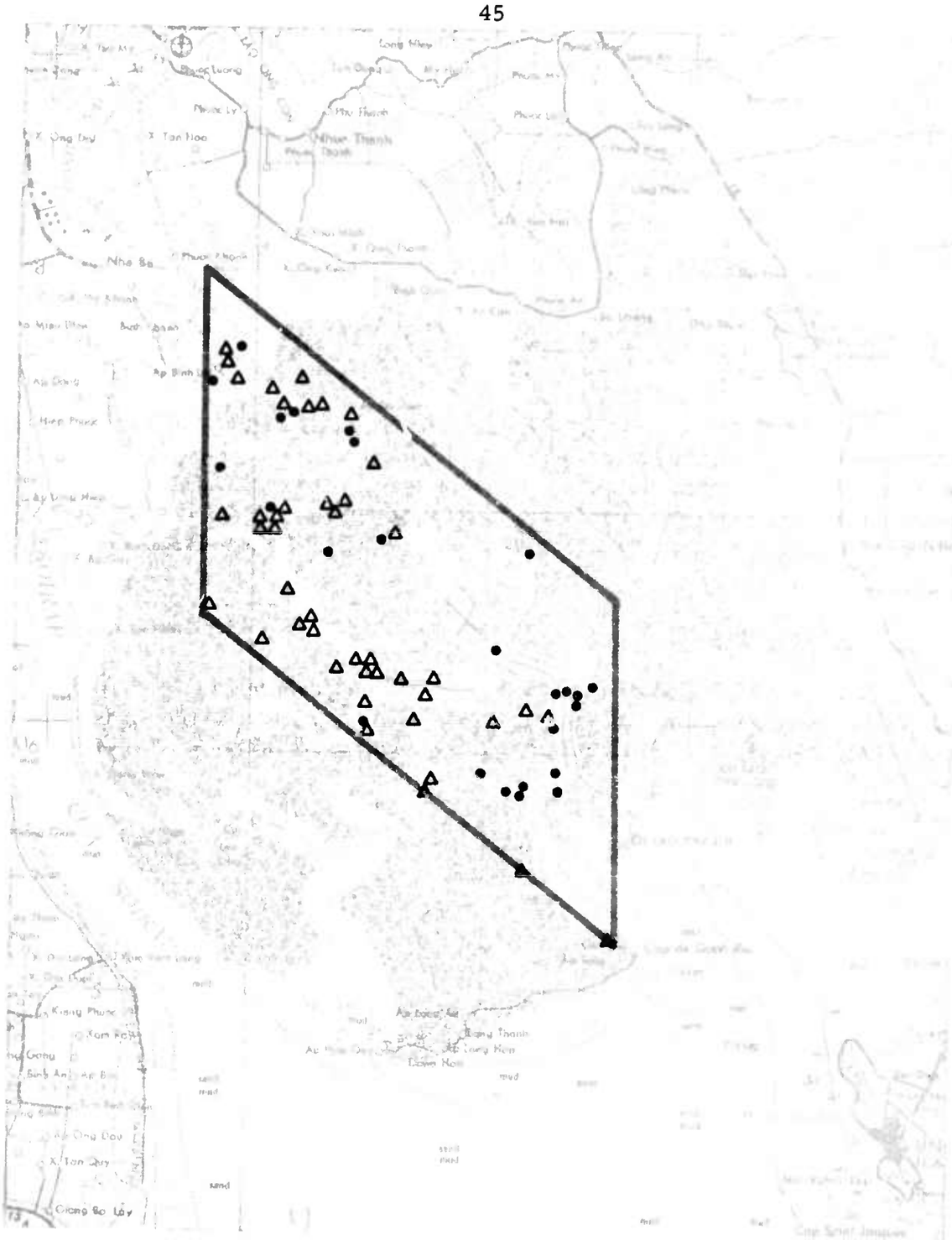
(C) Region 7 is located to the southeast of Saigon in the Rung Sat Special Zone and includes the ship channel to Saigon. Figure 16 is a map of the region.

Defoliation

(C) In April, 1964, 1,480 hectares were sprayed in this region and an additional 480 hectares in March, 1965. The principal spraying took place in January and February, 1966, when a total of 6,665 hectares were sprayed.

VC-Initiated Incidents

(C) Region 7 has not been a very active region in terms of the number of incidents; the principal reason for spraying was the importance of the ship channel to Saigon. Only 25 incidents were reported during the year 1965 but of those 16 were actions against boats. The extensive defoliation does not seem to have done anything to reduce the VC activity since there were 32 incidents, exclusive of actions against aircraft, in 1966 and 15 of these were actions against boats. There is, of course, the possibility that there was some holdover in effect of earlier defoliations and the possibility that without the 1966 defoliation the incident rate would have been higher, but these are speculative and cannot be proven. Incidents in Region 7 are shown in the following tabulation.



(CONFIDENTIAL)

FIGURE 16. REGION 7, BOUNDARIES AND LOCATION OF VC-INITIATED INCIDENTS (U)

● Before defoliation △ After defoliation

Objective Group	Before Defoliation	After Defoliation
Boats	16	15
Aircraft	0	12
Military Units	1	9
All Other	8	8
	25	44

(CONFIDENTIAL)

(C) There is evidence of increased friendly forces activity after defoliation as evidenced by the increased actions against aircraft (0 to 12) and military personnel (1 to 9). Even when these two objective groups are excluded, there was no decrease in number of actions against other objectives (24 vs 23), weighted total intensity (63 vs 63), or mean incident intensity (2.63 vs 2.86).

Summary and Conclusions

(C) Extensive defoliation spraying has been performed in the Rung Sat Special Zone along the ship channel. Incident rates were low in the region both before and after spraying. Defoliation did not reduce the number of actions against boats.

Region 8

Location and Description

(C) Region 8 is a large region which begins about 20 km east of Saigon and extends eastward for 110 km. Its dimension in the north-south direction is 100 km. It is bounded on the east by Highway 15, the Y coordinate of the northern boundary is YT000, and the X coordinate of the eastern boundary is YS300. The coastline along the South China Sea forms the southern boundary.

(C) A number of highways run through the region and portions of them were focal points for VC activity and for defoliation. The principal towns in the region are Vung Tan, Phnoc Loi, and Binh Gia. Figure 17 is a map of the region.

Defoliation

(C) Defoliation began in December, 1965, and was performed extensively in December and in January, 1966. A total of 5,175 hectares were sprayed during

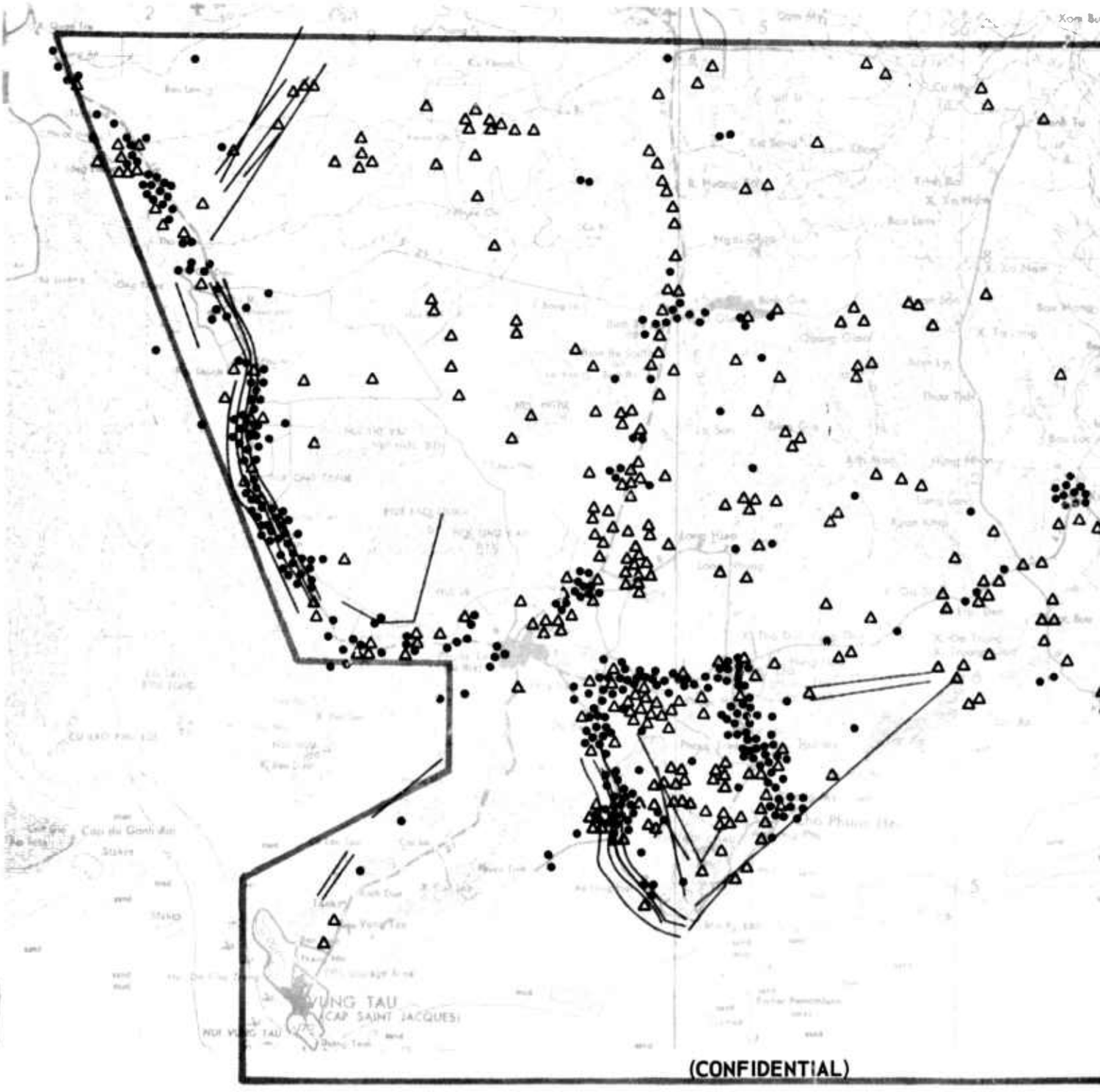
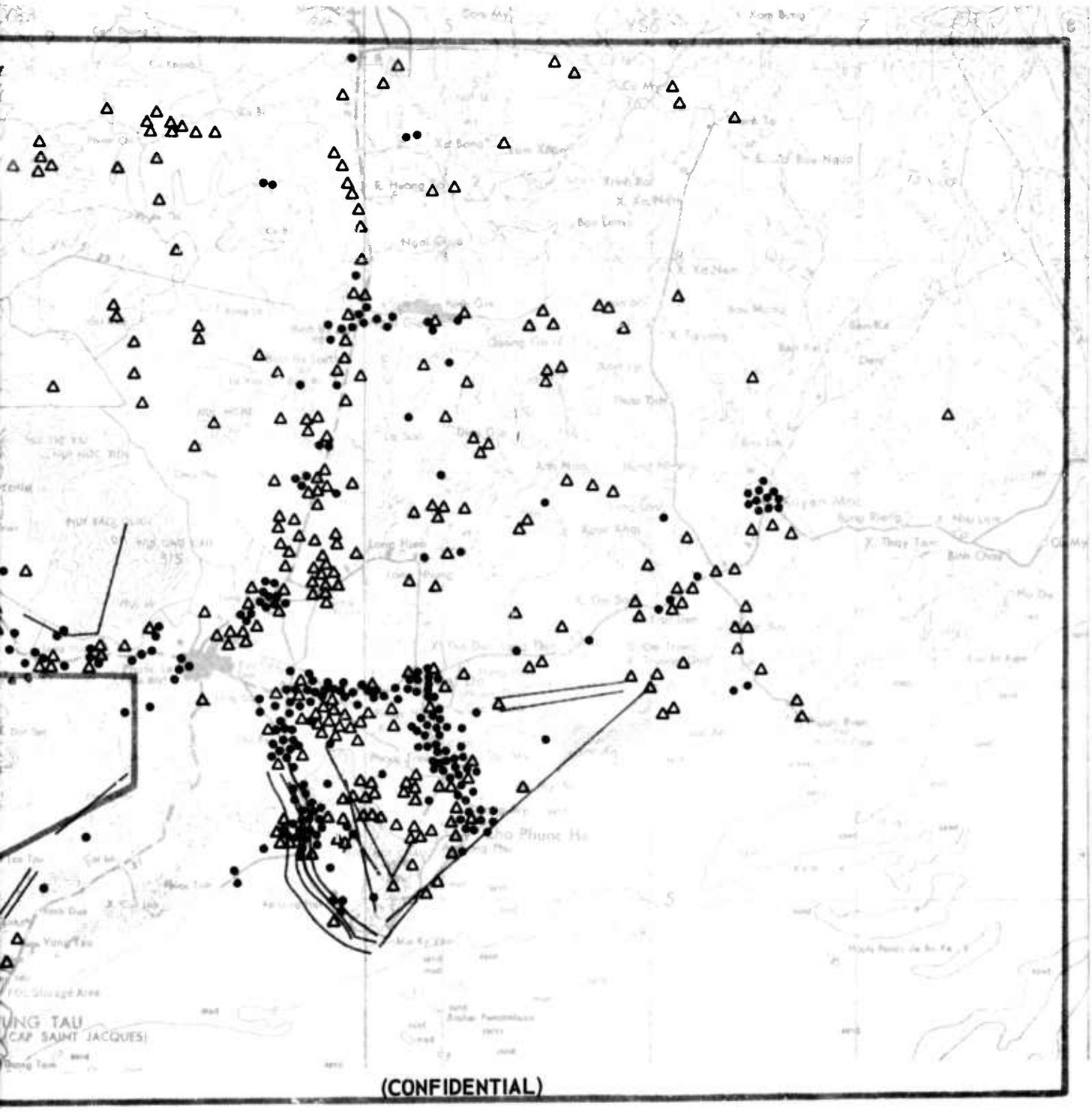


FIGURE 17. REGION 8, BOUNDARIES, LOCATION OF DEFOLIATION MISSIONS AND LOCATION OF VC-INITIATED INCIDENTS (U)

● Before defoliation △ After defoliation

47 and 48



8, BOUNDARIES, LOCATION OF DEFOLIATION
AND LOCATION OF VC-INITIATED
TS (U)

e defoliation △ After defoliation

those 2 months. Some spraying was done in nearly every month from then until July, 1966, for a total of an additional 4,025 hectares. The locations of the defoliation missions are shown in Figure 17.

VC-Initiated Incidents

(C) Region 8 is a region of high VC activity both before and after defoliation and exhibited very definite changes in the VC objectives. However, it will be shown that the changes cannot be attributed to the defoliation but were more likely due to other factors.

(C) Several of the VC objective groups showed dramatic changes in the incident rates when the 12-month periods before and after defoliation are compared. Examination of the monthly listing, Appendix B, reveals that the rate increase or decrease in every classification began in the month of defoliation or in the month following. The distributions of incidents by months are shown in Figure 18 where all objective groups which increased in incident rate are taken together and all objective groups which decreased in incident rate are taken together. The sudden shift in VC objectives is very clear.

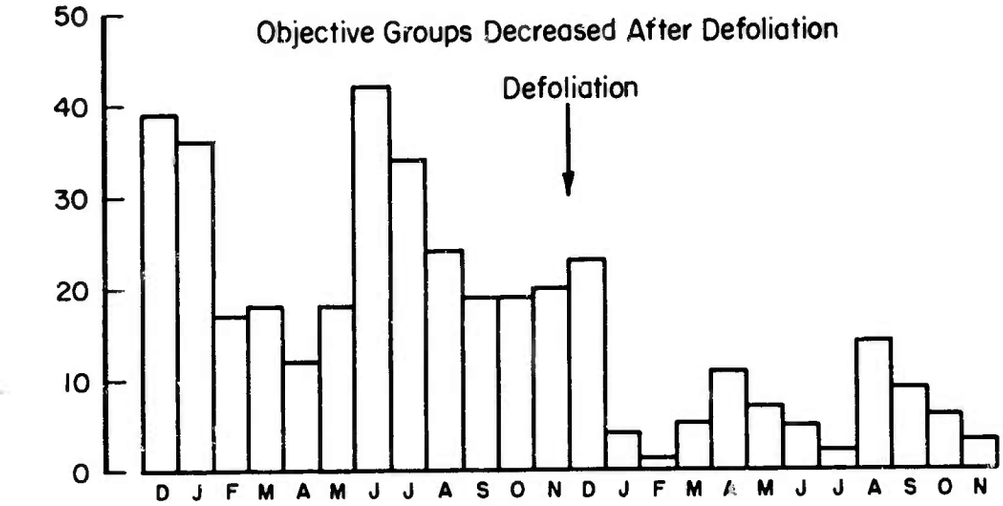
(C) More detail is shown in the following tabulation, which is a summary of the incident counts in the region for the 12-month periods before and after defoliation, by objective group.

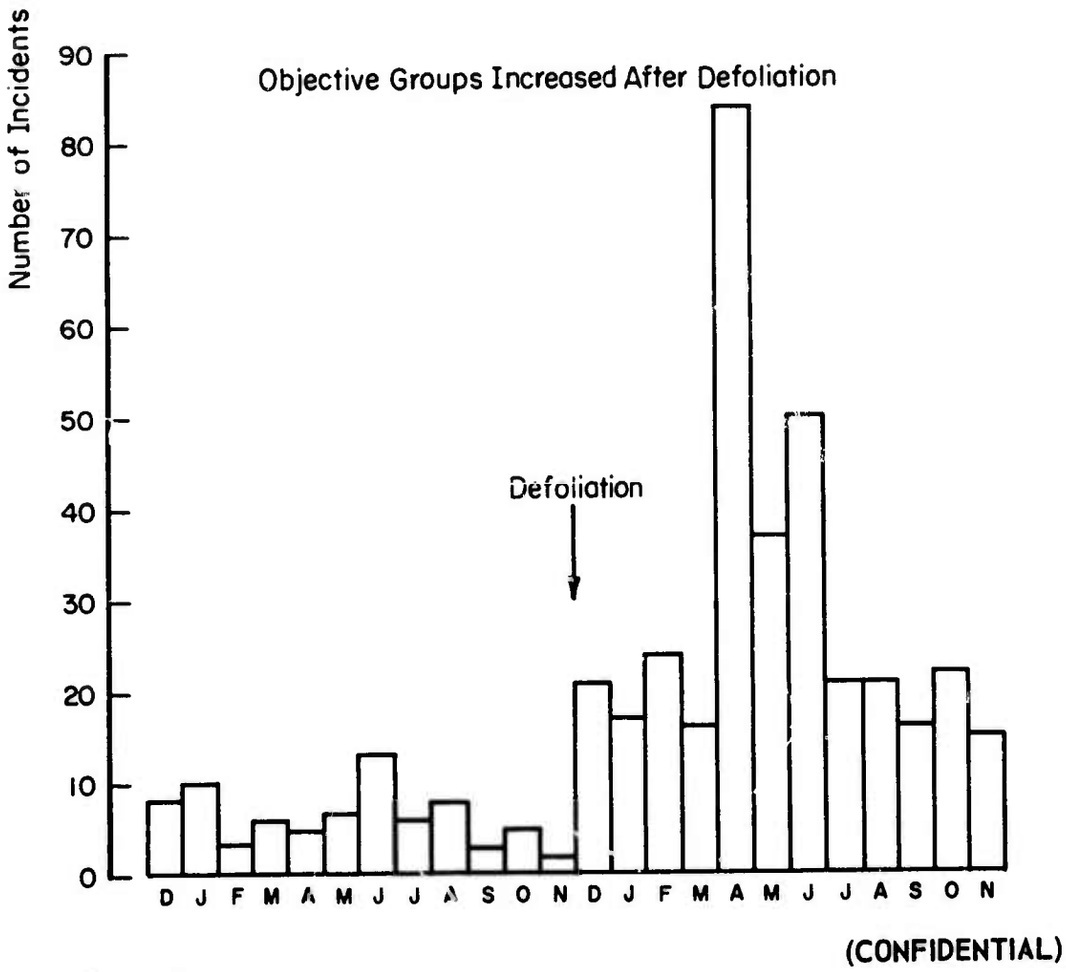
Objective Group	Before	After	Change
Roads	169	50	-119
Military Facilities	35	38	+ 3
Civilian Facilities	77	18	- 59
Military Personnel	41	201	+160
Aircraft	0	108	+108
Civilians	23	12	- 11
Other	26	10	- 16
	371	437	+ 66

(CONFIDENTIAL)

(C) The objective group "other" includes objectives in the utilities, boats, area, and materiel classifications.

(C) VC actions against roads, civilians, civilian facilities, and the objectives in the "other" group all decreased strongly, by about 70 percent overall. Actions against military facilities were essentially unchanged at a fairly low level.





(CONFIDENTIAL)

FIGURE 18. REGION 8, DISTRIBUTION OF INCIDENTS (U)

On the other hand, VC actions against military personnel and aircraft increased tremendously. Both of these increases began in the month of defoliation. In fact, not a single action against aircraft was reported before defoliation began. The monthly incident distributions for various types of objectives are shown in Figure 19.

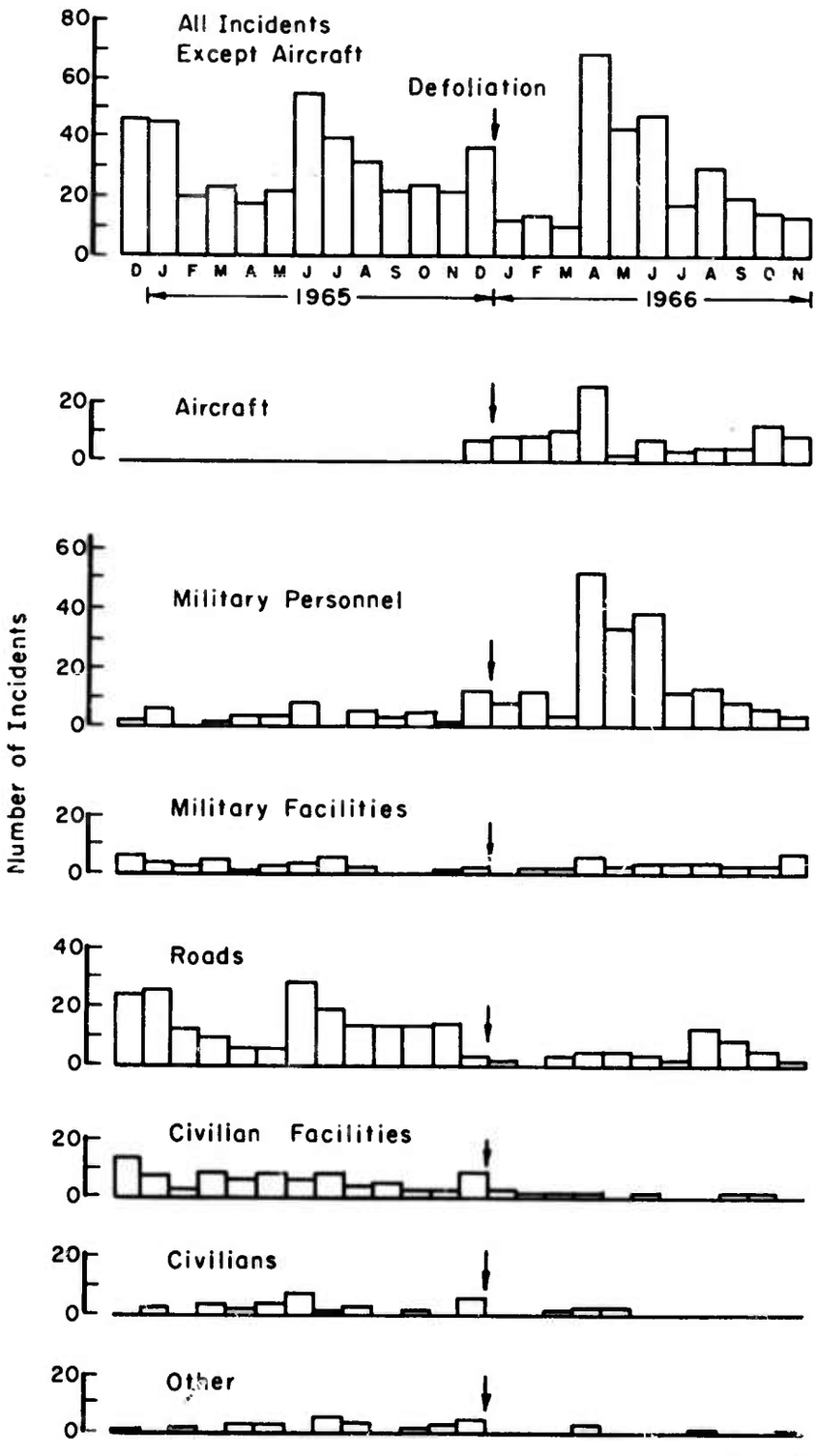
(C) It is unlikely that friendly troop presence and air activity were the same both before and after defoliation and that VC objectives suddenly changed coincidently with defoliation. Instead, it may be inferred from the data that there was greatly increased presence of friendly troops and aircraft, and that defoliation was a prelude to, or a part of, the increased friendly forces activity. If this was the case, then the VC were forced to divert certain of their efforts to these new targets which constituted a threat to them. The diversion of their efforts necessarily created a decline in the number of actions against types of objectives which had formerly received a large measure of their attention. Therefore, it is not possible to ascribe the changes in types of objective or the decrease in actions against certain types of objectives to the defoliation.

(C) Using the Schwartz weighting scheme as a measure of VC activity, the weighted totals of all incidents increased 41 percent from 944 to 1,333, and the mean intensity increased 20 percent, from 2.54 to 3.05. Much of the increase in the weighted total results from the large number of actions against military personnel and aircraft. If the actions in which these two groups were the objective are eliminated, the weighted totals shows a drop of about 50 percent (821 to 403), but since the number of actions against these other groups decreased 62 percent (330 to 127) the mean intensity shows an increase of 28 percent (2.48 to 3.17). In other words, after defoliation, there were fewer actions but they were more intense than before defoliation.

Summary and Conclusions

(C) Region 8 was a region of high VC activity both before and after defoliation. VC actions against roads, civilians, and civilian facilities decreased by 70 percent when incident counts for a 1-year period on each side of the defoliation are compared. However, there were five times as many actions against military personnel after defoliation as there were before (41 to 201) and 108 actions against aircraft after defoliation but none before. All changes in incident rates began during the month of defoliation or the month after.

(C) It is concluded that defoliation was accompanied by a significant increase in friendly forces' ground and air activity and that, therefore, the changes in VC objectives cannot be ascribed to effects of the defoliation.



(CONFIDENTIAL)

FIGURE 19. REGION 8, DISTRIBUTION OF INCIDENTS (U)

SUMMARY OF FINDINGS

(C) Two approaches to the analysis of the incident data were used. In the first, five measures of activity were defined:

(1) n - the total number of incidents in a data period

(2) W. T. - the weighted total of the incidents occurring in a data period

(3) μ_I - the average intensity per incident for each period, calculated as W. T. /n

(4) μ_m - the average intensity of incidents per month for each period, calculated as W. T. /number of months of data

(5) f - the average monthly frequency of occurrence of incidents for each period, calculated as n/number of months of data.

(C) The average intensity, μ_I, was calculated to indicate changes in the level of VC effort in the region. When considered together with n, the number of incidents, the pair of measures indicate a change in the type of VC action. It is necessary to consider the pair of measures since the mean intensity could remain constant if, for example, the action shifted to a higher intensity level and the number of actions decreased. The last two measures, μ_m and f, are closely related and in most cases a change in one appears in the other. Since these measures reduce the data to a "per month" basis, they allow the comparison of two data periods of differing length. They can be considered as standardized versions of the two previous measures, W. T. and n.

(C) After examining the data it was seen that these measures, although useful as indicators of VC activity, are not sufficient to interpret changes in the activity.

(C) This is because other factors, seasonal and military operations effects, which will be discussed presently, are included in the measures and tend to obscure the effects of defoliation, if any.

(C) The second approach to the analysis, then, was to count the incidents not only by time periods but also by the type of VC objective. This type of tabulation made it possible to see whether the specific defoliation target type (road, river bank, etc.) was subject to change in the number of VC actions after the spraying had taken effect.

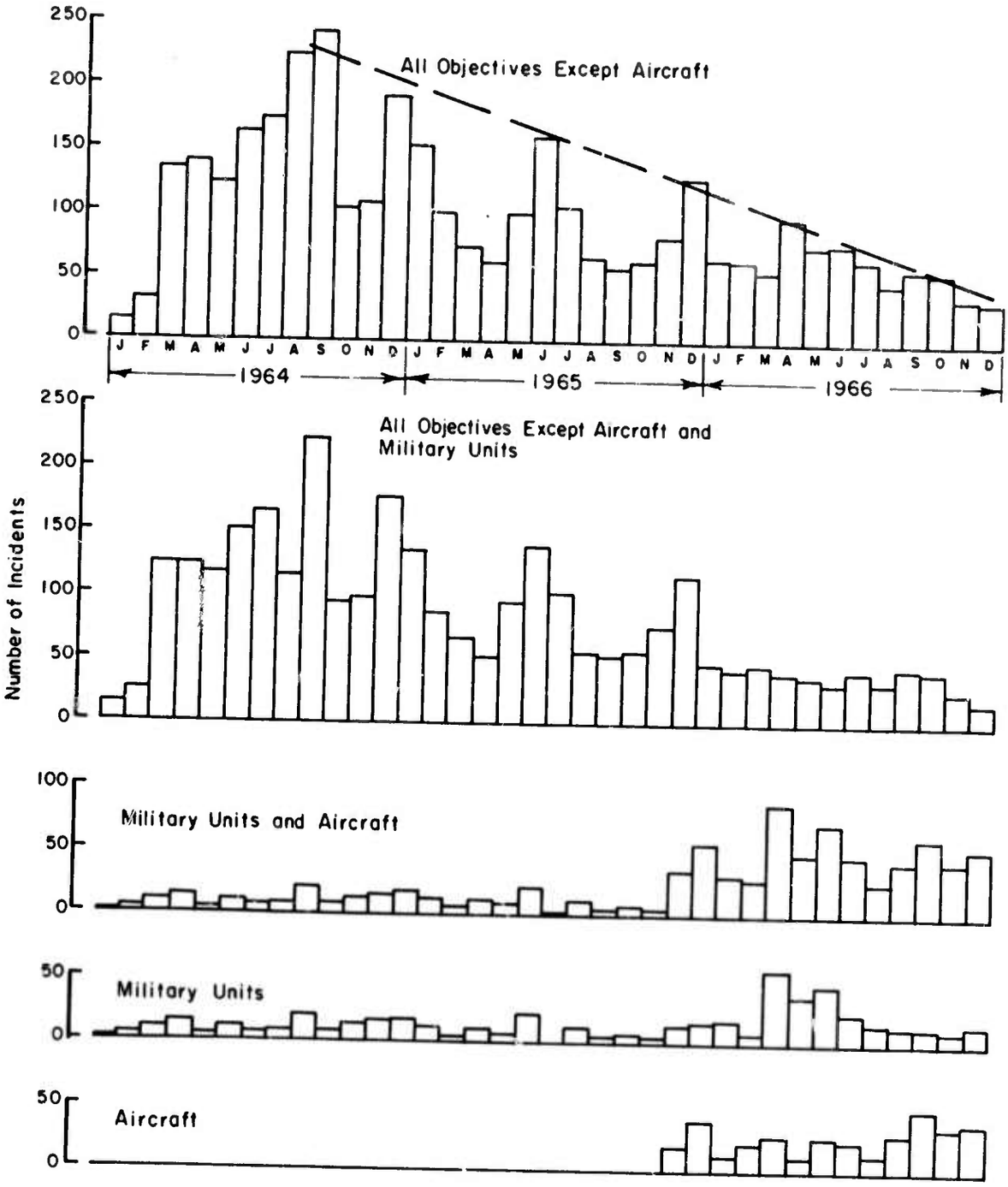
(C) When this was done the expected seasonal variations in incident counts could be seen, with peaks occurring in June-July and again in December-January. This is shown in the upper histogram of Figure 20, where the counts for all regions have been included. Incidents involving aircraft were excluded since it was found that they are closely related to the defoliation dates.

(C) Because the points in the foliage growth cycle at which spraying will be effective and the seasonal conditions which are most suitable for VC activity correspond, all spraying was done in the month, or just prior to the month, of peak VC activity. Since a decline in activity follows the spraying, one might be led to believe that the spraying had caused the decline in activity, if it were not for the fact that the same decrease can be observed for the corresponding months before defoliation. The first conclusion from a study is, therefore, that there is a regular seasonal variation in VC activity and that this can help to mask any effects of defoliation.

(C) Again referring to the upper part of Figure 20, there was a regular decline in the amplitude of the peaks, as indicated by the dashed line. This trend extends over the entire 3 years but since defoliation in six of the eight study regions did not take place until October, November, and December, 1965, the decline cannot be attributed entirely to defoliation. Probably it was due to increased friendly forces operations in the regions.

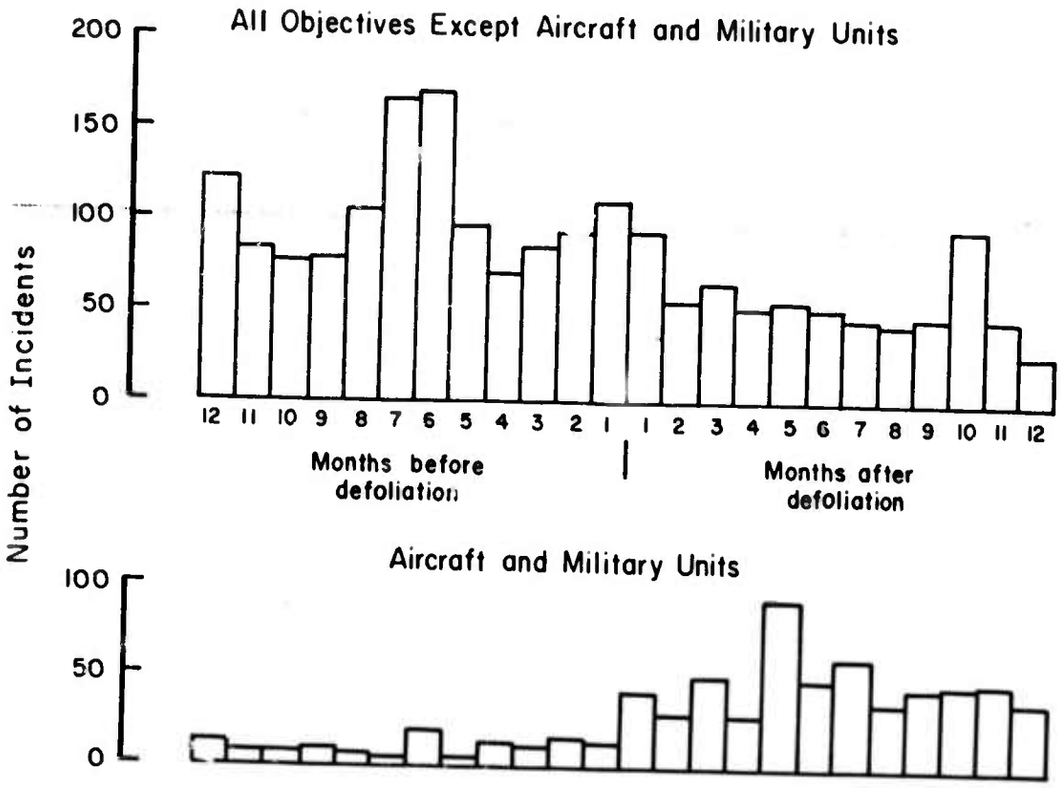
(C) As noted before, VC actions against aircraft are closely related to defoliation, significantly more occurring after the defoliation. The same thing is true of actions against military personnel. The middle histogram of Figure 20 shows the distribution of all incidents except those against aircraft and military personnel. Below is a histogram for these two objective categories. In January, 1966, there was a significant drop in the number of incidents exclusive of the two special groups. The incident level then stayed fairly constant through the remainder of the year without the usual seasonal peaks. On the other hand, the actions against military personnel and aircraft stayed quite close to a level of ten incidents per month through November, 1965. In December the incidents jumped to an average of 48 per month over the next 13 months. No actions against aircraft were reported prior to December, 1965, but the increase in average level of incidents also reflects an increase in actions against military personnel, two histograms at bottom of Figure 20.

(C) The data for all regions were summarized for the 12 months prior to and 12 months following each defoliation. Much the same indications were found, Figure 21. Prior to the mean defoliation date the average number of monthly incidents against objectives other than aircraft and military personnel was 105, after defoliation it was 56. The military categories have figures of 11 and 46 incidents per month, before and after defoliation.



(CONFIDENTIAL)

FIGURE 20. DISTRIBUTION OF INCIDENTS IN ALL REGIONS (U)



(CONFIDENTIAL)

FIGURE 21. DISTRIBUTION OF INCIDENTS BEFORE AND AFTER DEFOLIATION FOR ALL REGIONS (U)

(C) The data show that the number of VC actions against objectives other than aircraft and military personnel decreased after defoliation. They also show that there was increased presence of aircraft and ground forces in the regions after defoliation. It is quite likely that defoliation makes air support more effective by improving target visibility, thus causing the VC to reduce their actions in the defoliated regions. However, the evidence is strong that there was increased presence of friendly forces, and this factor may have been the primary cause of reduced VC activity.

(C) Regions 1, 3, 6, and 7 had river banks as the principal defoliation targets. All four had low average monthly incident rates, less than seven per month. None had a high rate of incidents against boats, the highest being Region 7 with a rate of 1.3 incidents per month. There were only 43 incidents in the four regions over a 24-month period, and, although these were divided into 24 before and 19 after defoliation, the data are insufficient to make any conclusions. There was some increase in aircraft and military personnel activity in Region 7, otherwise the actions against objectives showed little change.

(C) In Regions 2, 4, 5, and 8 actions against roads and civilian facilities decreased after defoliation. There was no clear consistency in actions against other objectives. In Region 2 actions against military facilities increased somewhat, in Regions 4 and 5 they decreased, while in Region 8 they remained constant in number. The number of incidents against other than aircraft and military unit decreased significantly in Regions 4, 5, and 8 although the number of incidents against the military objectives decreased in Regions 4 and 5 and increased in Region 8. In Region 2 there was an insignificant decrease in incidents although the incidents against the military categories increased significantly.

(C) The results of this study can be summarized as:

(1) VC actions against all objectives were found to decrease following defoliation.

(2) Monthly incident counts show a seasonal variation with peaks in June-July and December-January. Defoliation spraying is often performed during these months so that subsequent declines in VC activity cannot necessarily be attributed to the results of the spraying.

(3) Defoliation is often followed by increased air and ground activity of friendly forces. While defoliation may increase the effectiveness of air-to-ground targeting, it is not possible at this time to separate the effects of the defoliation-aircraft combination from the effects of increased presence of ground forces.

(4) This study should not be interpreted as meaning that defoliation does not have an effect on VC incidents, but that not enough information is available to detect the defoliation effects.

RECOMMENDATIONS

(C) Three recommendations are made as a result of this study.

(1) Seasonal variations in VC incident rates tend to obscure possible defoliation effects. The variations can be taken into account somewhat by summarizing the data for 12 months on each side of the defoliation date. Defoliation effects would become more clear, and time periods other than 12 months would be possible, if seasonal effects would be removed from the data. It is recommended that, if further work is done, some investigation into the possibility of removing the seasonal portion of the data variability should be made.

(2) Defoliation is often followed by increased air and ground activity. The present study does not reveal the roles of these forces, either separately or in conjunction with defoliation, on VC activity. It is recommended that if further work is done an attempt should be made to determine these effects. As an aid to this effort, some information about the presence of friendly forces should be made available.

(3) Reports of spraying missions are not complete enough to identify the defoliation target in all cases. When only the coordinates of the mission end-points are given, it is not always possible to determine whether a straight-line path was flown or whether the flight path followed some natural line such as a river. It is recommended that if further work is done, more complete mission reports be supplied as well as all available defoliation evaluation reports.

APPENDIX A

COMPUTER PROGRAMS

APPENDIX A

COMPUTER PROGRAMS

Three computer programs were written to handle the magnetic tapes containing the incident data. The first program, JOIN, rewrites the tapes in a different format that permits faster computer operation.

A second program, EDIT, can be used to blank out any incidents for which the data are incomplete or in error or which are duplicates of other incident records. EDIT will function with tapes in either format. In addition to the editing function, it can also be used to make a copy of a tape.

The third program, SELECT, is used to select, count, and list all incidents which fall into specified categories. The program will operate on tapes which have been written in either format.

The programs were written in FORTRAN IV for the Control Data 3400 computer. Some changes will have to be made for use on machines not having features such as buffered input/output or the ENCODE and DECODE statements.

Each of the programs is discussed in the following sections. Flow charts for each program follow the program discussion. Program listings for all three programs will be found at the end of this appendix.

Program JOIN

The magnetic tapes received from the Defense Intelligence Agency were written in what is known as the ASR (Al Schwartz Report) format. Details of the format are given in Table A-1. Tapes in this format contain a record at the start of each tape, followed by an end-of-file (EOF) mark. The incident data are written in Binary-Coded Decimal (BCD), one incident to a record, 15 words to the record.

The SELECT program, which is used to pull certain specified types of data from the tapes, has provision for limiting the search to the interval between given record numbers. Operation of the SELECT program is speeded if the incidents are written with more than one incident to a record.

When the program encounters an EOF mark on the tape being copied it will read a card. A blank card will cause the program to pause and "CHANGE REELS"

will be typed out. One blank card must be provided for each reel to be copied. A card with EXIT punched in Columns 1-4 will terminate the run.

TABLE A-1. MAGNETIC TAPE INCIDENT FORMAT

Field	BCD Character Positions
Block character count	1-4
Record character count	5-8
UTM coordinates	9-16
SDATE (Day)	17-18
SDATE (Month)	19-20
SDATE (Year)	21-22
STIME (Hour, Minute)	23-26
CDATE (Day)	27-28
CDATE (Month)	29-30
CDATE (Year)	31-32
CTIME (Hour, Minute)	33-36
VCOBJ	37-38
VCACT	39-40
FUNIT	41
FKIAQ	42-44
FWIAQ	45-47
FMIAQ	48-50
COMMENTS	51-118
BLANK	119
RECORD MARK	120

Program EDIT

This program is used to delete records for incidents which contain errors in the data. Examples of data errors are missing or incomplete coordinates or alphabetic characters in numeric fields. Cases have been observed where duplicate records of a single incident appear to be present. One of the records should be deleted.

Program EDIT can be used with tapes in either the ASR (Mode 1) or BMI (Mode 2) format.

Card Input Order

Three types of input cards are used. They must be entered in the order EDIT (multiple cards), MODE, DO.

EDIT Cards

These cards contain a list of the record numbers to be deleted. The record numbers may be obtained by using the SELECT program to obtain a complete listing of the tape contents and examining the list for error or duplicated records. The SELECT program will also print a list of records having BCD characters in numeric fields.

The list of records is entered, ten record numbers to a card, in the format:

Card Column	
1-4	EDIT
9-13	First record to be deleted
16-20	Second record to be deleted
.	
.	
.	
72-76	Tenth record to be deleted

Fields on a card may be left blank but any record numbers which are entered must be in ascending numerical order. The ascending order must be maintained from card to card.

A maximum of 7500 records may be named for deletion.

MODE Card

The MODE card specifies the format in which the magnetic tape to be edited has been written. The format is:

Card Column	
1-4	MODE
16	1 for ASR format 2 for BMI format

DO Card

The DO card initiates the tape reading and editing. If no EDIT cards have been entered, an exact copy of the tape will be produced. "DO" must be punched in card Columns 1 and 2.

Program SELECT

The program is used to read the magnetic tape that contains incident data, to select from it all incidents that fall into specified categories, to print the selected incidents, and to count them. The categories under which selection may be made are VC action code, VC objective code, geographical area, and date of incident. Specific information regarding selection in each category is entered into the computer on leader cards. New leader cards may be entered during the course of a run.

The program permits the naming of a group of VC action codes so that an incident having an action code which matches any one of the codes in the group will be selected. In the same way it is possible to select incidents having an objective code that matches any one of a prespecified group of objective codes. Geographical coordinates may be specified to define an area within which incidents are of interest. The duration of a time interval and the number of intervals on either side of a base data may be named. Incidents that fall into one of the intervals will be selected and counted.

Input Cards

Six types of cards are used to control operation of the program. Formats and details of use for each of the types VCACT, VCOBJ, MODE, SELECT, PAUSE, and "blank" are given below:

VCACT and VCOBJ Cards

Data for each incident contain codes describing the type of VC action and the VC objective. There are 34 action codes and 75 objective codes (Appendix C). The VCACT and VCOBJ cards contain lists of action and objective codes that are to be considered as a group. Each card also bears a number that identifies the group. By referencing the group numbers, on the SELECT card, an incident having an action card objective code that matches any one of the codes in the respective named groups will be selected.

The codes comprising one VC action (or VC objective) group are contained on a single card. A maximum of 20 codes is allowed for each group.

The contents of a maximum of ten VCACT cards and ten VCOBJ cards can be stored in the program at one time. If more than ten cards of either type are entered, they will begin to fill the action or objective storage tables from the top, erasing the information which was stored there.

VCACT and VCOBJ cards must be read in before a SELECT card which references them is entered. However, subject only to this restriction, VCACT and VCOBJ cards may be entered at any card read time during a computer run. Card formats are:

Card Column	VCACT Card	VCOBJ Card
1-5	VCACT	VCOBJ
9-10	Group number	Group number
12-13	Action code 1	Objective code 1
15-16	Action code 2	Objective code 2
.	.	.
.	.	.
.	.	.
69-70	Action code 20	Objective code 20

MODE Card

The magnetic tapes to be read by this program may be written in either the ASR (MODE 1) or BMI (MODE 2) format. Tapes written in ASR format have one incident per record and contain a file record and end-of-file mark at the start of each reel. Tapes written in BMI format have 100 incidents per record and no file record or end-of-file mark at the start of the tape. For further information on tape formats see Table A-1. The card format is:

Card Column	
1-4	MODE
-16	1 ASR format
	2 BMI format

PAUSE Card

The PAUSE card causes the program to rewind the tape and to type the instruction "change reels" to the operator. The program pauses. This allows the operator to replace the reel with a reel containing data for another year. The PAUSE card may be followed by VCACT, VCOBJ, MODE, or SELECT cards. If no changes are to be made in action groups, objective groups, or mode, it is not necessary to reenter any previously defined groups or mode. A SELECT card would then directly follow the PAUSE card. The card format is:

Card Column	
1-5	PAUSE

"Blank" Card

A blank card causes exit from the program.

SELECT Card

The SELECT card instructs the program on which data are to be selected for counting. The selection may be made on the basis of date of the incident, geographical coordinate, action group, and objective group. The card is also used to control printing of detailed data for the selected incidents and to indicate the portion of the tape to be searched.

Read-in of a SELECT card initiates the search and select process. Therefore, it is necessary that action and objective groups which are referenced on the SELECT card will have been previously defined by VCACT and VCOBJ cards. The tape mode must also be defined by a MODE card before entry of the first SELECT card.

Any number of SELECT cards may be entered in succession. See the note under "Search Limits". The card format is:

Card Column	
1-6	SELECT
9-10	Base date, Day
11-12	Month
13-14	Year
15-16	Not used
17-18	Interval for summarization periods (months)
19-20	Number of intervals (on one side of base date)
21	Sum intervals before date: 0 No 1 Yes
22	Sum intervals after date: 0 No 1 Yes
23	Not used

Coordinate Area Definition

24-31	Coordinate 1
32-39	Coordinate 2
40-47	Coordinate 3
48-55	Coordinate 4
56-57	Action group to be selected
58-59	Objective group to be selected
60	Not used
61	Print switch: 0 Print sums only 1 Print details of selected incidents
62	Not used
63-67	Lower search limit on incident list
68-72	Upper search limit on incident list
73-80	Not used

Time Selection

Columns 9 through 22 provide information as to how the incidents are to be selected and summarized with respect to dates. If the date, Columns 9-14, is left blank, no selection will be made on the basis of date and all incidents selected on the basis of other criteria will be summarized together. Columns 17 through 22 will have no meaning and may be left blank.

Assuming that some base date is entered in Columns 9-14, the permissible punches for Columns 15-22 and the resulting computer action are shown below.

Interval For Summarization Period Columns 17-18	Number of Intervals Columns 19-20	Minus Side of Date Column 21	Plus Side of Date Column 22	Program Action
0	0	0	0	Select all incidents on the given date
0	0	0	1	Select all incidents after date. Given date is beginning of period.
0	0	1	0	Select all incidents before date. Given date is not included in period.
M (months)	N	0	1	Sum all incidents after date into N intervals, each size M. Date to date + M - 1 day date + M to date + 2 M -1 day . . . Date + (N - 1)M to date + NM - 1 day
M (months)	N	1	0	Sum all incidents before date into N intervals, each size M. Date not included.
M (months)	N	1	1	Sum all incidents in N intervals before and N intervals after date, each of size M

The maximum number of counting intervals is 72. If counting is to be done in intervals before and after the date, then the maximum number of intervals which can be named on the card is 36.

Coordinate Selection

Coordinates, both on the data tapes and on the input cards, are given in the military Universal Transverse Mercator (UTM) system. Each coordinate consists of a pair of alphabetical letters, which identify a 100,000-meter square, and two sets of three-digit numbers which are the x and y coordinates, respectively, within the 100,000-meter square, for example, WX349864. The alphabetical identifications are shown in Figure A-1.

Coordinates which delineate the area from which incidents are to be selected may be specified on the SELECT card. Either one, two, or four coordinates may be named. The naming of three coordinates is invalid.

No Coordinates. If no coordinates are given on the SELECT card, all incidents will be considered, regardless of their coordinates.

One Coordinate. Only incidents which have the specific named coordinate will be selected.

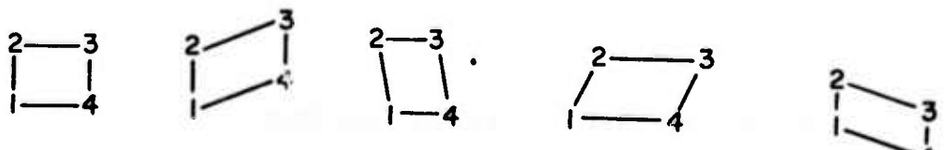
Two Coordinates. All incidents which have coordinates lying on a straight line between the two named coordinates will be selected. The coordinates must be named on the card in the order shown below.

Case 1 Case 2 Case 3 Case 4

Three Coordinates. Invalid specification.

Four Coordinates. All incidents which lie within the area indicated by the four points, or which lie along the straight lines joining them, will be selected.

The four points must define a parallelogram. Two sides of the parallelogram must be parallel to one of the coordinate axes. The coordinates of the vertices must be given on the SELECT card in the order shown below.



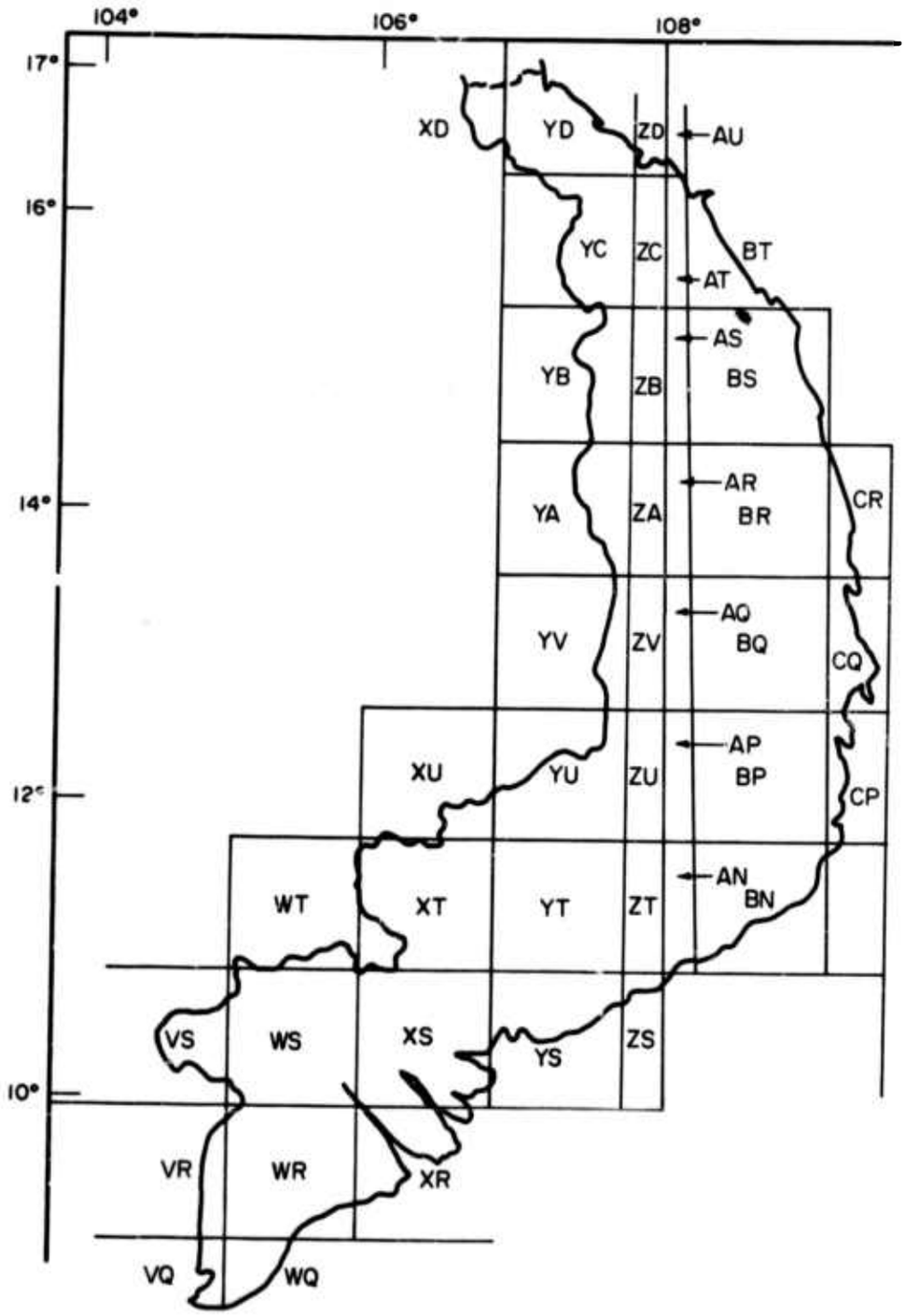


FIGURE A-1. SOUTH VIETNAM UTM GRID

VC Action Selection

Card Columns 56-57 are used to name the VC action group for which incidents are to be selected. Since up to ten groupings of actions may be held in the program at one time, the SELECT card can name any one of the ten. No selection is made on the basis of action group if Columns 57-57 are blank or zero.

VC Objective Selection

Card Columns 58-59 are used to name the VC objective group for which incidents are to be selected. Since up to ten groupings of objectives may be held in the program at one time, the SELECT card can name any of the ten. No selection is made on the basis of objective group if Columns 58-59 are blank or zero.

Search Limits

Incidents are arranged on the data tapes in order of the coordinates, increasing y coordinate within each x coordinate. Search time for incidents to be selected can be reduced if the program is instructed to examine only those incidents between the limits given in Columns 63-67 and 68-72. Values for the limits may be obtained from a listing of the tape, each incident including null records counting as one.

Computer search time can also be reduced by arranging the SELECT cards in increasing order of the lower search limit.

Notes on Program Operation

Coordinate Transformations

To facilitate computerization testing whether a given coordinate is within a specified area, all coordinates are transformed from their normal alpha-numeric form into a strictly numerical form.

The first two characters of a coordinate pair are alphabetic and identify a specific 100,000-meter square within a zone. The first letter gives the position of the square in an easterly direction from the western boundary of the zone; the second letter gives the position in a northerly direction from the southern boundary of the zone. Thus, a letter can be interpreted as a specific distance from a known point. The remainder of the coordinate consists of two three-digit sets which give

the x and y distances of the point within the square. It is possible then to assign a numerical equivalent to each letter and to add to it the corresponding portion of the numerical coordinate to obtain a strictly numerical coordinate.

The 100,000-meter square which includes the southwesternmost portion of South Vietnam is labled VQ. For the purposes of this program the southwestern corner of this square was taken as the (0,0) point. Coordinate letters were assigned values from this point.

It will be noted by reference to Figure A-1 that the squares with first letter Z or A are not as wide as the other squares, that is, they are not 100,000 meters wide. This is because a longitude adjustment zone of the UTM system runs through South Vietnam. Furthermore, it will be noted that the "squares" at the south, e.g., ZS, are wider than those to the north, e.g., ZC.

Maps of the country were examined and the taper of the coordinate squares was determined. The accuracy obtained by this method is not very good but is sufficient for the present purposes. The numerical equivalents of the alphabetical locations are shown in Table A-2. They appear in the program in a table called CTRANS (coordinate transformation). The numbers have been reduced by a factor of 100 since that is the accuracy of the coordinates given in the VCA file.

In the program the corresponding numerical equivalent of the alphabetic portion of the coordinate is found from the table and added to the input numerical value. Example: If the input coordinate is given as AT135842, the values used in the program are

$$x = 4216 + 135 = 4351$$

$$y = 3000 + 842 = 3842 \quad .$$

Testing Whether a Coordinate Falls Within the Specified Area

The general procedure for determining whether a point falls within the defined area is to calculate the coefficients for four straight lines which enclose the area. Then as each data point is considered it is tested to see whether it falls to the right of, below, to the left of, and above the four lines, respectively. If the point meets all of these conditions then it is within the defined area. The general equations of the four lines are:

TABLE A-2. ALPHABETIC TO NUMERIC TRANSFORMATIONS FOR SOUTH VIETNAM

Letters	X	Y	Letters	X	Y
VQ	0	0	CP	5531	4000
WQ	1000	0	YV	3000	5000
VR	0	1000	ZV	4000	5000
WR	1000	1000	AQ	4255	5000
XR	2000	1000	BQ	4510	5000
VS	0	2000	CQ	5510	5000
WS	1000	2000	YA	3000	6000
XS	2000	2000	ZA	4000	6000
YS	3000	2000	AR	4243	1000
ZS	4000	2000	BR	4486	1000
AM	4285	2000	CR	5486	1000
WT	1000	3000	YB	3000	7000
XT	2000	3000	ZB	4000	7000
YT	3000	3000	AS	4230	2000
ZT	4000	3000	BS	4460	2000
AN	4276	3000	YC	3000	8000
BN	4551	3000	ZC	4000	8000
CN	5551	3000	AT	4216	3000
XU	2000	4000	BT	4432	3000
YU	3000	4000	XD	2000	9000
ZU	4000	4000	YD	3000	9000
AP	4266	4000	ZD	4000	9000
BP	4531	4000	AU	4200	9000

$$L_{12} \quad X = \frac{x_1 - x_2}{y_1 - y_2} y_p + \frac{x_2 y_1 - x_1 y_2}{y_1 - y_2} = A_1 y_p + B_1$$

$$L_{23} \quad Y = \frac{y_2 - y_3}{x_2 - x_3} x_p + \frac{x_2 y_3 - x_3 y_2}{x_2 - x_3} = A_2 x_p + B_2$$

$$L_{34} \quad X = \frac{x_3 - x_4}{y_3 - y_4} y_p + \frac{x_4 y_3 - x_3 y_4}{y_3 - y_4} = A_3 x_3 + B_3$$

$$L_{41} \quad Y = \frac{y_4 - y_1}{x_4 - x_1} x_p + \frac{x_4 y_1 - x_1 y_4}{x_4 - x_1} = A_4 x_4 + B_4 \quad .$$

The coefficients, A and B, are computed and stored in two tables called ATAB and BTAB.

Substitute	In	If	Then
y_p	L_{12}	$X \leq x_p$	Continue
		$X \geq x_p$	Exit
x_p	L_{23}	$Y \geq y_p$	Continue
		$Y < y_p$	Exit
yp	L_{34}	$X \geq x_p$	Continue
		$X < x_p$	Exit
x_p	L_{41}	$Y \leq y_p$	Save the point
		$Y > y_p$	Exit

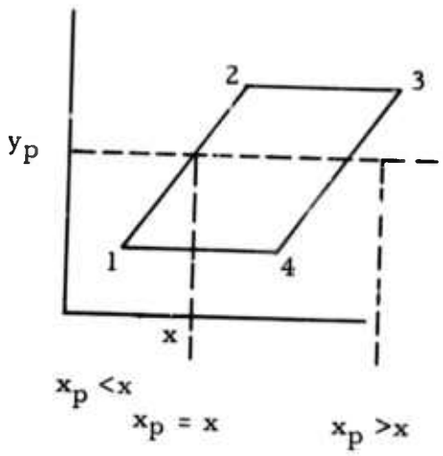


FIGURE A-2.

When the SELECT card is read, it is tested to determine whether there are one, two, or four coordinates given.

If no coordinates are given (take incidents at all locations) then we set $B_2 = 1000$ and $B_3 = 6000$ so that they are outside any possible country coordinates.

If one coordinate is given:

$$B_1 = X_1,\ B_2 = Y_1,\ B_3 = X_1,\ B_4 = Y_1.$$

If two coordinates are given:

(1) $X_1 = X_2,\ Y_2 > Y_1$

$$B_1 = X_1,\ B_2 = Y_2,\ B_3 = X_2,\ B_4 = Y_1$$

(2) $X_1 = X_2,\ x_i < X_2,\ Y_1 = Y_2$

$$B_1 = X_1,\ B_2 = Y_2,\ B_3 = X_2,\ B_4 = Y_1$$

(3) $X_1 = X_2,\ X_1 < X_2,\ Y_1 = Y_2$

$$B_1 = X_1,\ B_2 = \frac{X_1Y_2 - X_2Y_1}{X_1 - X_2},\ B_3 = X_2,\ B_4 = B_2$$

$$A_2 = \frac{Y_1 - Y_2}{X_1 - X_2},\ A_4 = A_2.$$

If four coordinates, defining a parallelogram, are given:

$$A_1 = \frac{X_1 - X_2}{Y_1 - Y_2}, \quad B_1 = \frac{X_2Y_1 - X_1Y_2}{Y_1 - Y_2}$$

$$A_2 = \frac{Y_2 - Y_3}{X_2 - X_3}, \quad B_2 = \frac{X_2Y_3 - X_3Y_4}{X_2 - X_3}$$

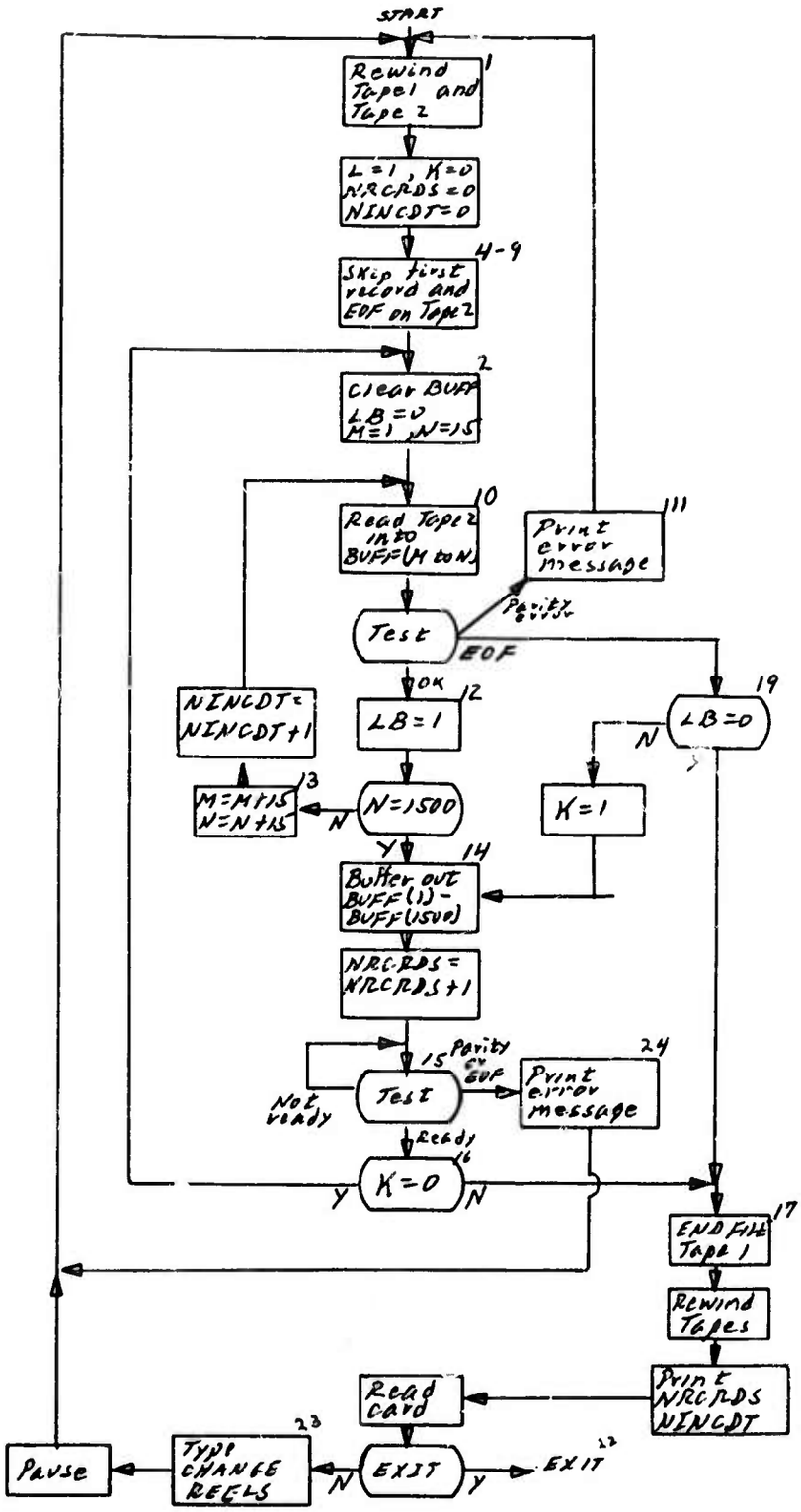
$$A_3 = \frac{X_3 - X_4}{Y_3 - Y_3}, \quad B_3 = \frac{X_4Y_3 - X_3Y_4}{Y_3 - Y_4}$$

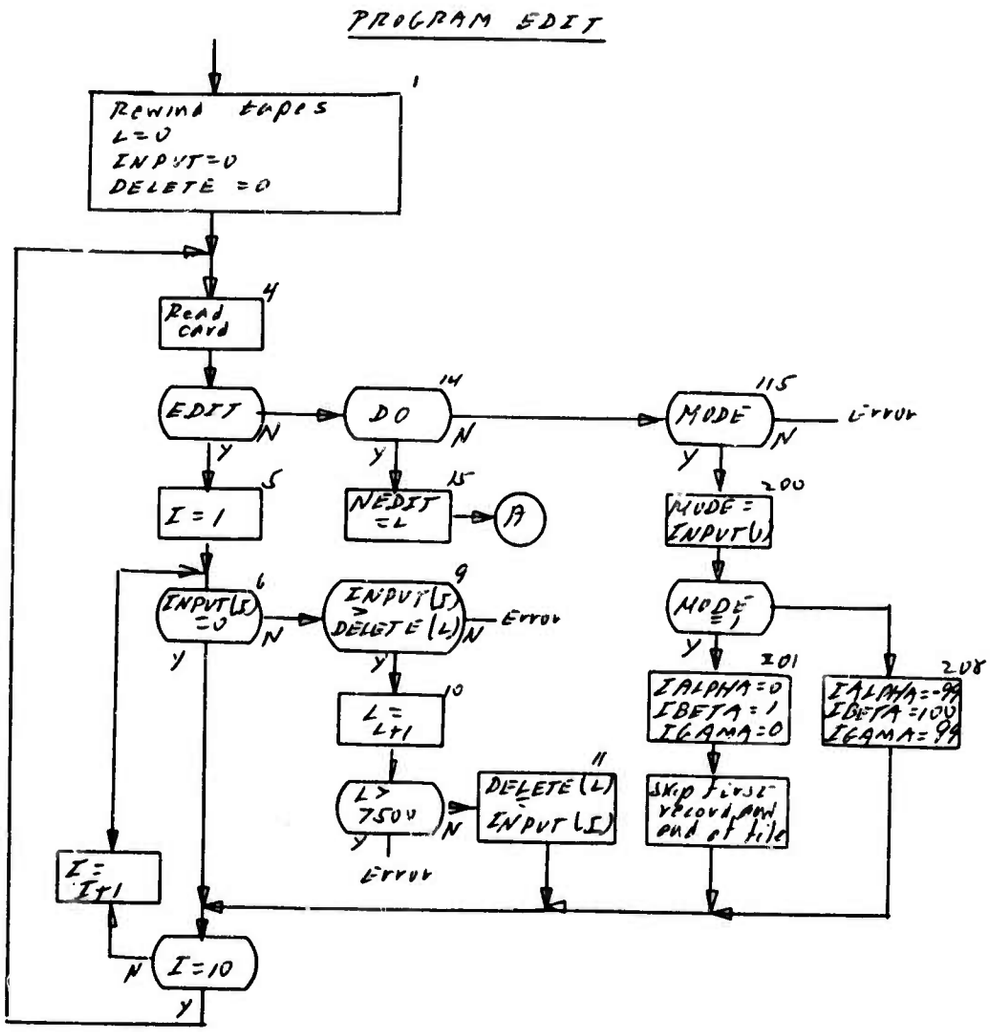
$$A_4 = \frac{Y_4 - Y_1}{X_4 - X_1} \quad B_4 = \frac{X_4Y_1 - X_1Y_4}{X_4 - X_1} \quad .$$

All coefficients which are not specified are set to zero.

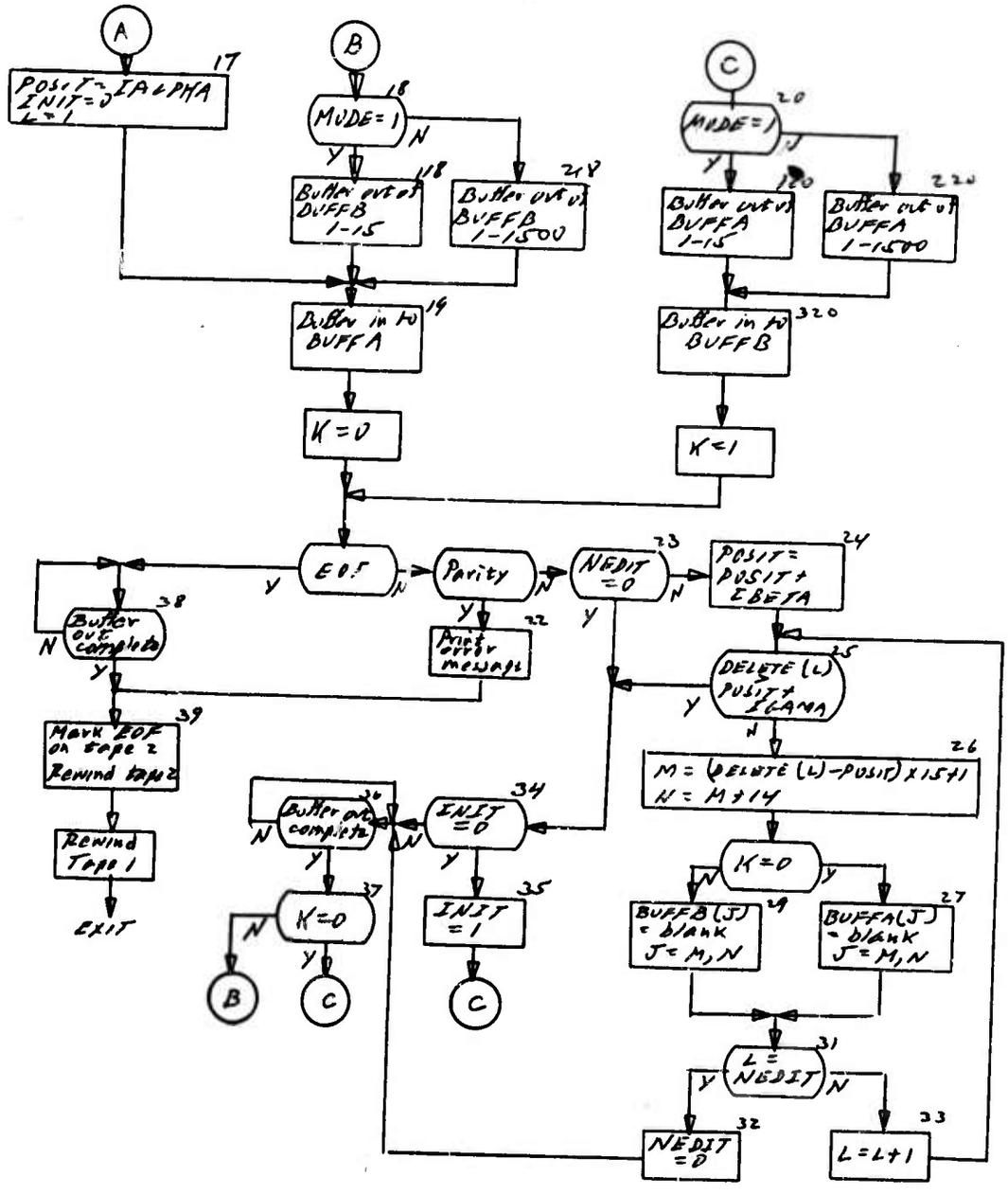
A-16

Program JOIN



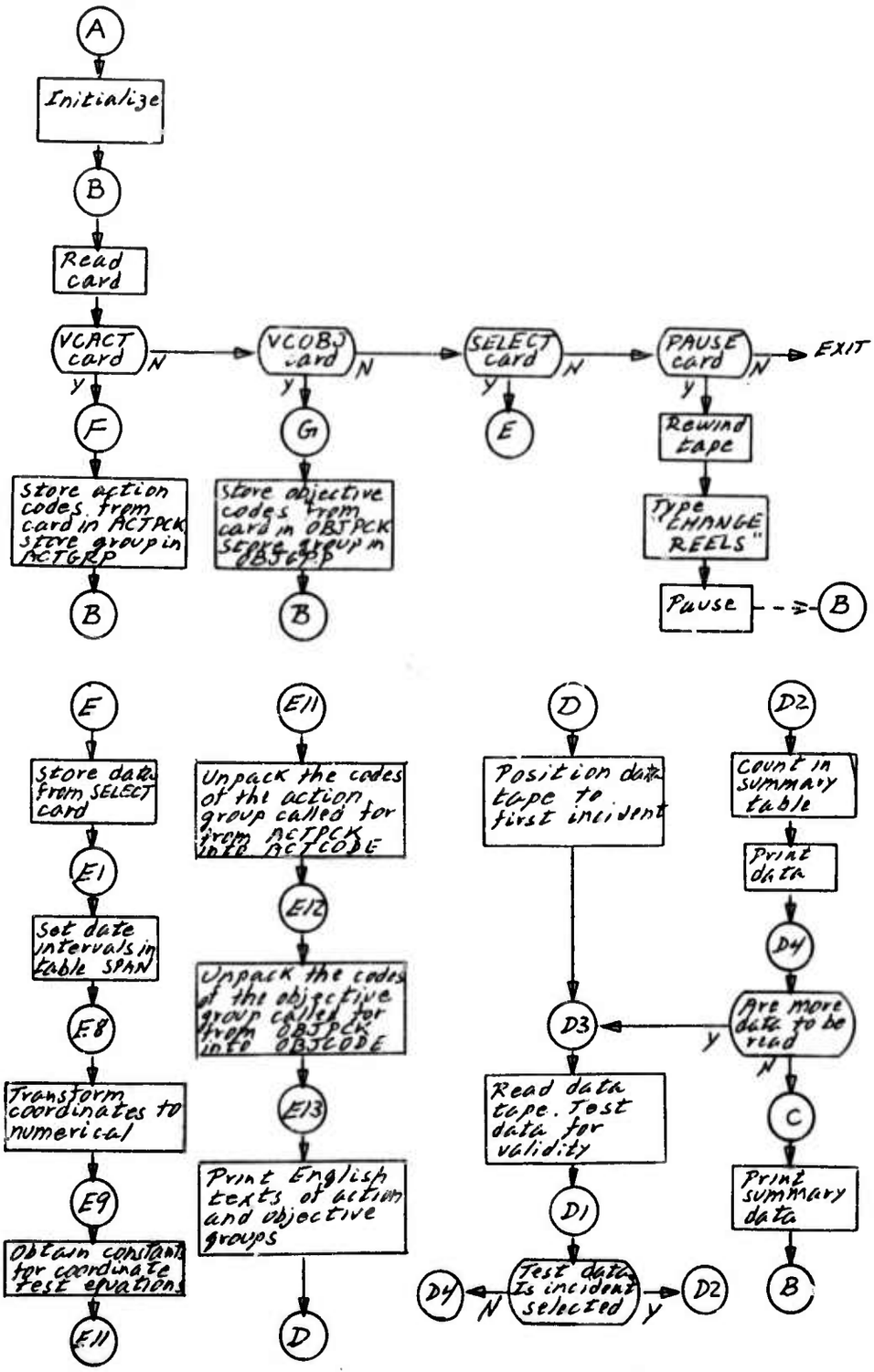

PROGRAM EDIT
1
Rewind tapes
L=0
INPUT=0
DELETE =0
4
Read card
EDIT
N
Y
14
DO
N
Y
115
MODE
N
Y
Error
5
I = 1
15
NEDIT =L
A
200
MODE = INPUT(L)
6
INPUT(L) =0
N
Y
9
INPUT(L) = DELETE(L)
N
Y
Error
MODE =1
Y
201
IALPHA=0
IBETA =1
IGAMA=0
208
IALPHA=-99
IBETA =100
IGAMA=99
10
L = L+1
11
DELETE(L) = INPUT(L)
L > 7500
N
Y
Error
Skip first record and end of file
I = I+1
N
I=10
Y

PROGRAM EDIT

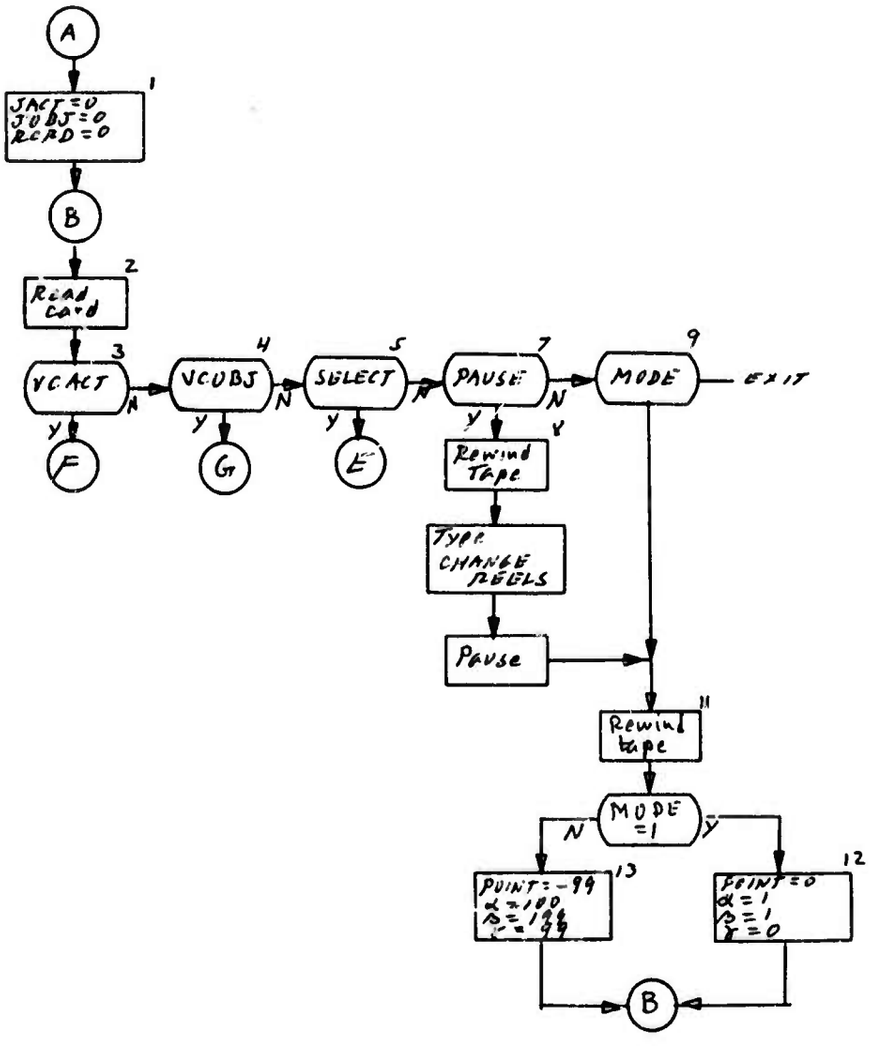


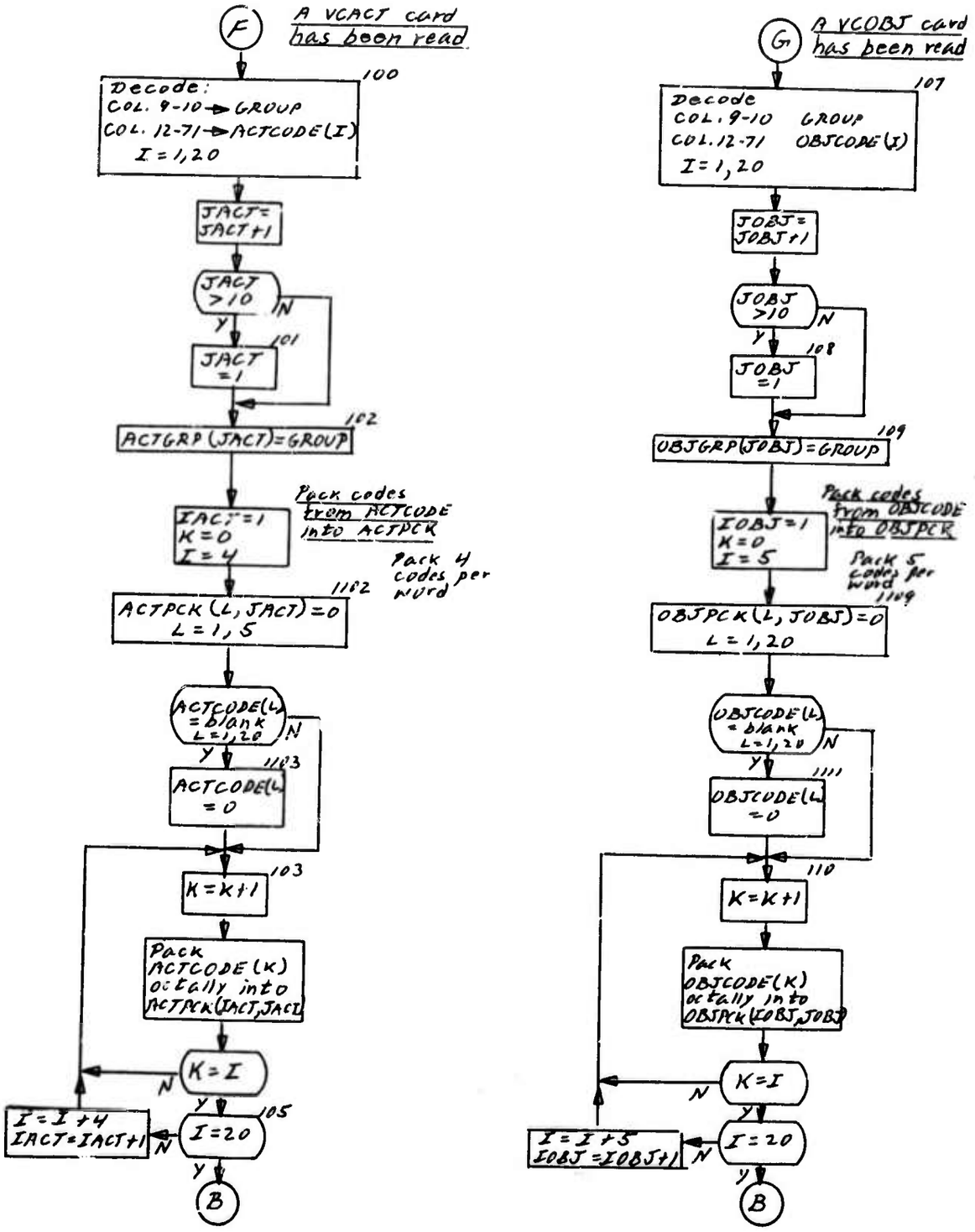
PROGRAM SELECT

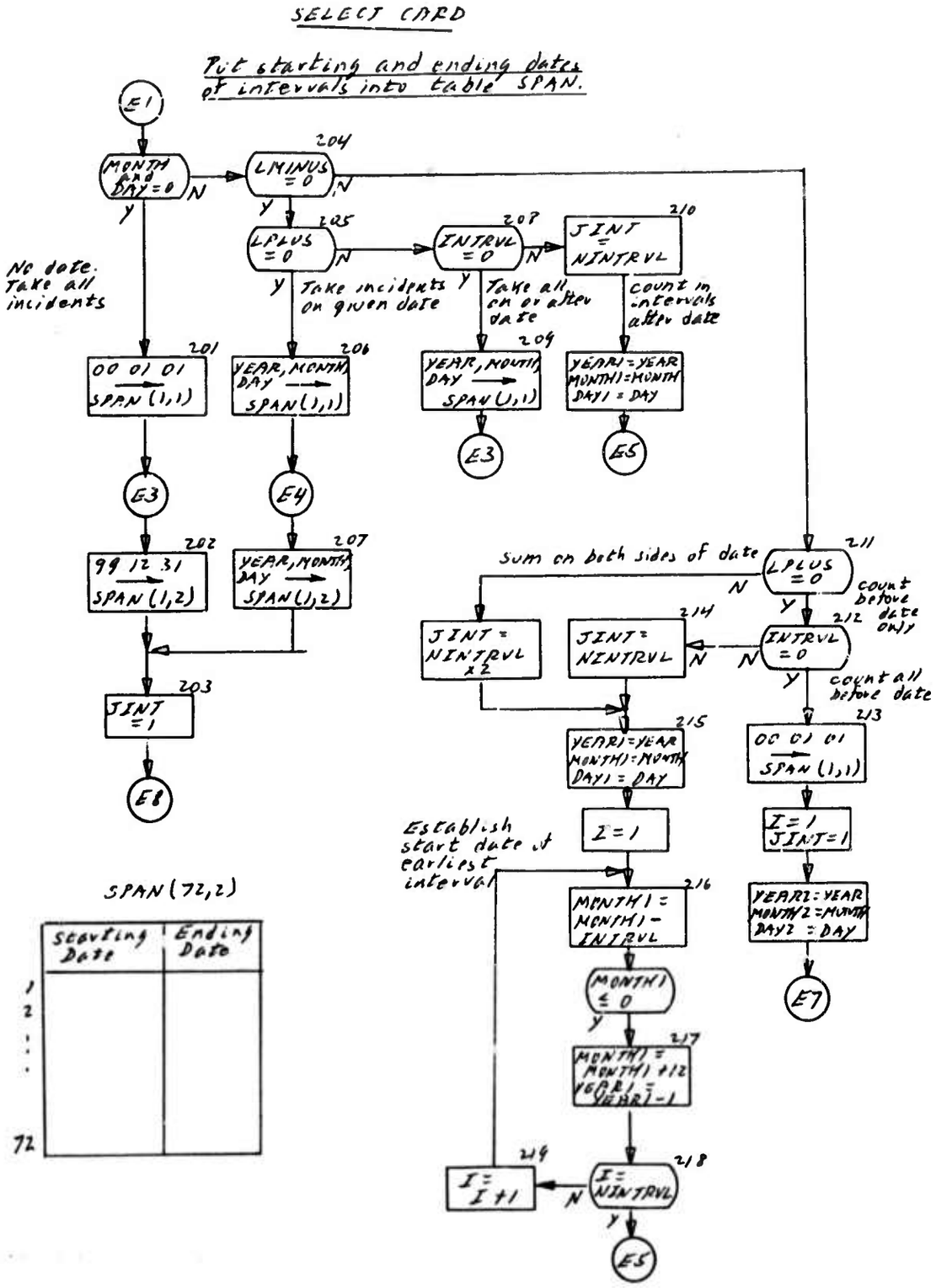
GENERAL FLOW CHART

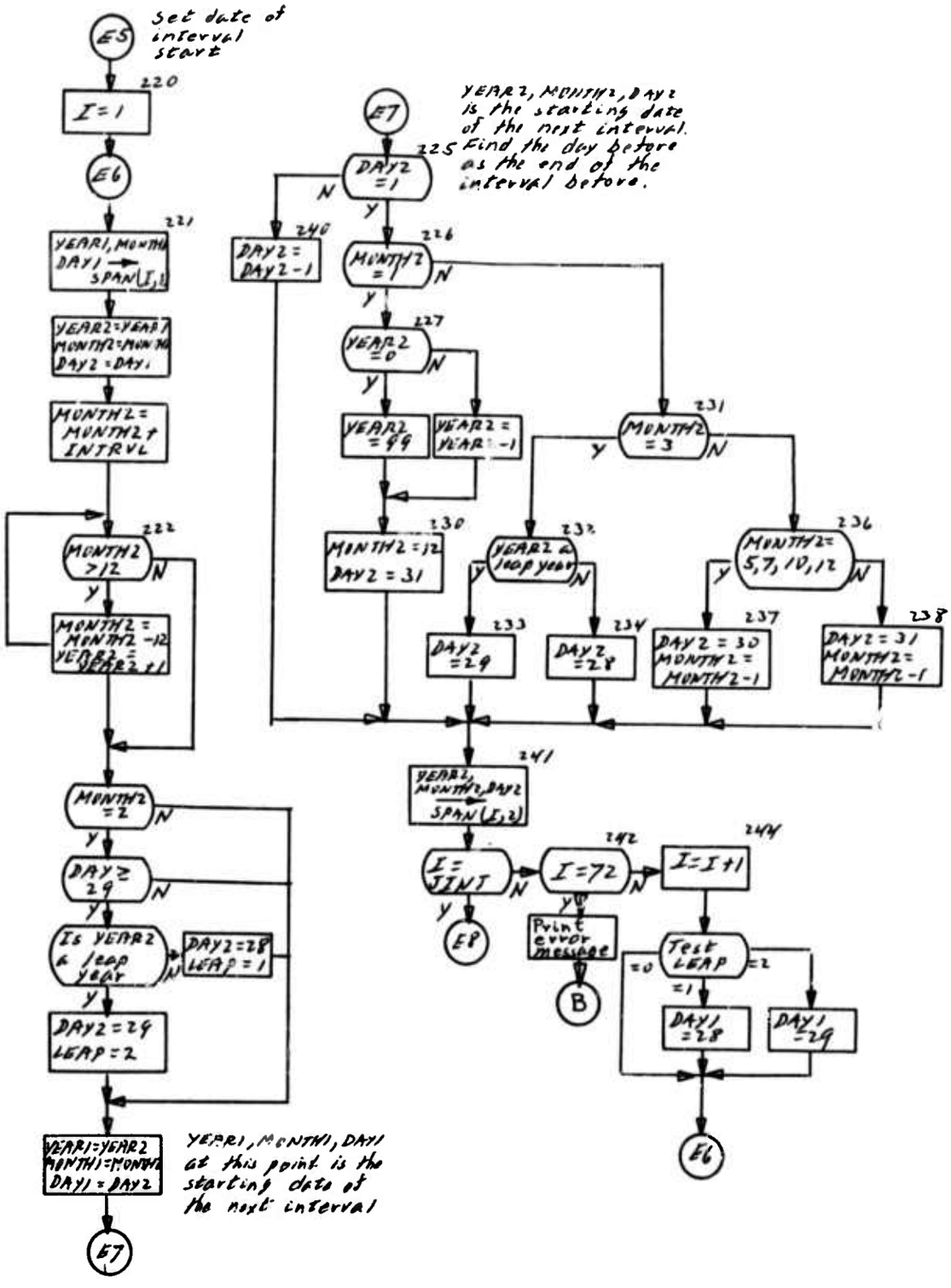


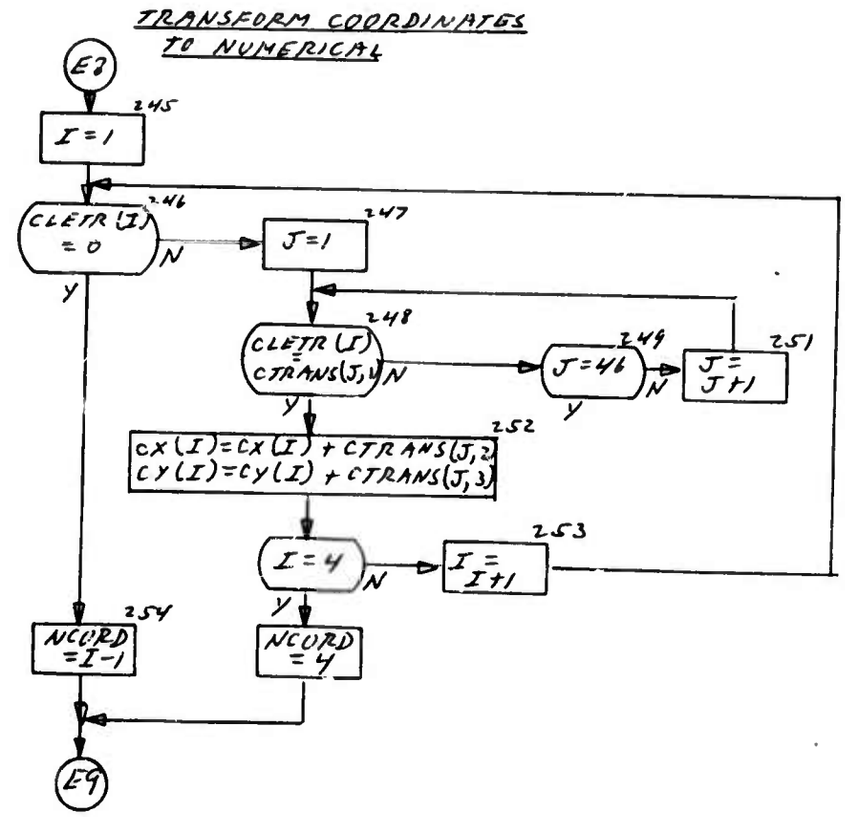
PROGRAM SELECT




F
A VCACT card has been read
100
Decode:
COL. 9-10 → GROUP
COL. 12-71 → ACTCODE(I)
I = 1,20
JACT = JACT+1
JACT >10
N
Y
101
JACT = 1
102
ACTGRP(JACT) = GROUP
Pack codes from ACTCODE into ACTPCK
IACT = 1
K = 0
I = 4
Pack 4 codes per word
1102
ACTPCK(L, JACT) = 0
L = 1,5
ACTCODE(L) = blank
L = 1,20
1103
ACTCODE(L) = 0
103
K = K+1
Pack ACTCODE(K) octally into ACTPCK(IACT, JACT)
K = I
I = I+4
IACT = IACT+1
105
I = 20
B
G
A VCOBJ card has been read
107
Decode
COL. 9-10 GROUP
COL. 12-71 OBJCODE(I)
I = 1,20
JOBJ = JOBJ+1
JOBJ >10
108
JOBJ = 1
109
OBJGRP(JOBJ) = GROUP
Pack codes from OBJCODE into OBJPCK
IOBJ = 1
K = 0
I = 5
Pack 5 codes per word
1109
OBJPCK(L, JOBJ) = 0
L = 1,20
OBJCODE(L) = blank
L = 1,20
1111
OBJCODE(L) = 0
110
K = K+1
Pack OBJCODE(K) octally into OBJPCK(IOBJ, JOBJ)
K = I
I = I+5
IOBJ = IOBJ+1
I = 20
B


SELECT CARD
Put starting and ending dates of intervals into table SPAN.
E1
MONTH and DAY = 0
N
Y
204
LMINUS = 0
N
Y
205
LPLUS = 0
N
Y
207
INTRVL = 0
N
Y
210
JINT = NINTRVL
No date. Take all incidents
Take incidents on given date
Take all on or after date
count in intervals after date
201
00 01 01 → SPAN(1,1)
206
YEAR, MONTH, DAY → SPAN(1,1)
209
YEAR, MONTH, DAY → SPAN(J,1)
YEAR1 = YEAR MONTH1 = MONTH DAY1 = DAY
E3
E4
E3
E5
202
99 12 31 → SPAN(1,2)
207
YEAR, MONTH, DAY → SPAN(1,2)
203
JINT = 1
E8
Sum on both sides of date
211
LPLUS = 0
N
Y
count before date only
212
INTRVL = 0
N
Y
count all before date
214
JINT = NINTRVL
JINT = NINTRVL x2
213
00 01 01 → SPAN(1,1)
I = 1
JINT = 1
215
YEAR1 = YEAR MONTH1 = MONTH DAY1 = DAY
I = 1
Establish start date of earliest interval
216
MONTH1 = MONTH1 - INTRVL
YEAR1 = YEAR MONTH2 = MONTH DAY2 = DAY
E7
(MONTH1) ≤ 0
Y
217
MONTH1 = MONTH1 + 12 YEAR1 = YEAR1 - 1
219
I = I + 1
218
I = NINTRVL
N
Y
E5
SPAN(72,2)
Starting Date
Ending Date
1
2
72


E5
Set date of interval start
220
I=1
E6
221
YEAR1, MONTH1, DAY1 → SPAN(I,1)
YEAR2=YEAR1 MONTH2=MONTH1 DAY2=DAY1
MONTH2=MONTH2+INTRVL
222
MONTH2 >12
MONTH2=MONTH2-12 YEAR2=YEAR2+1
MONTH2=2
DAY2≥29
Is YEAR2 a leap year
DAY2=28 LEAP=1
DAY2=29 LEAP=2
YEAR1=YEAR2 MONTH1=MONTH2 DAY1=DAY2
YEAR1, MONTH1, DAY1 at this point is the starting date of the next interval
E7
E7
YEAR2, MONTH2, DAY2 is the starting date of the next interval. Find the day before as the end of the interval before.
225
DAY2=1
240
DAY2=DAY2-1
226
MONTH2=1
227
YEAR2=0
YEAR2=99
YEAR2=YEAR2-1
230
MONTH2=12 DAY2=31
231
MONTH2=3
232
YEAR2 a leap year
233
DAY2=29
234
DAY2=28
236
MONTH2=5,7,10,12
237
DAY2=30 MONTH2=MONTH2-1
238
DAY2=31 MONTH2=MONTH2-1
241
YEAR2, MONTH2, DAY2 → SPAN(I,2)
I=JINT
E8
242
I=72
Print error message
B
244
I=I+1
Test LEAP
=0
=1
=2
DAY1=28
DAY1=29
E6

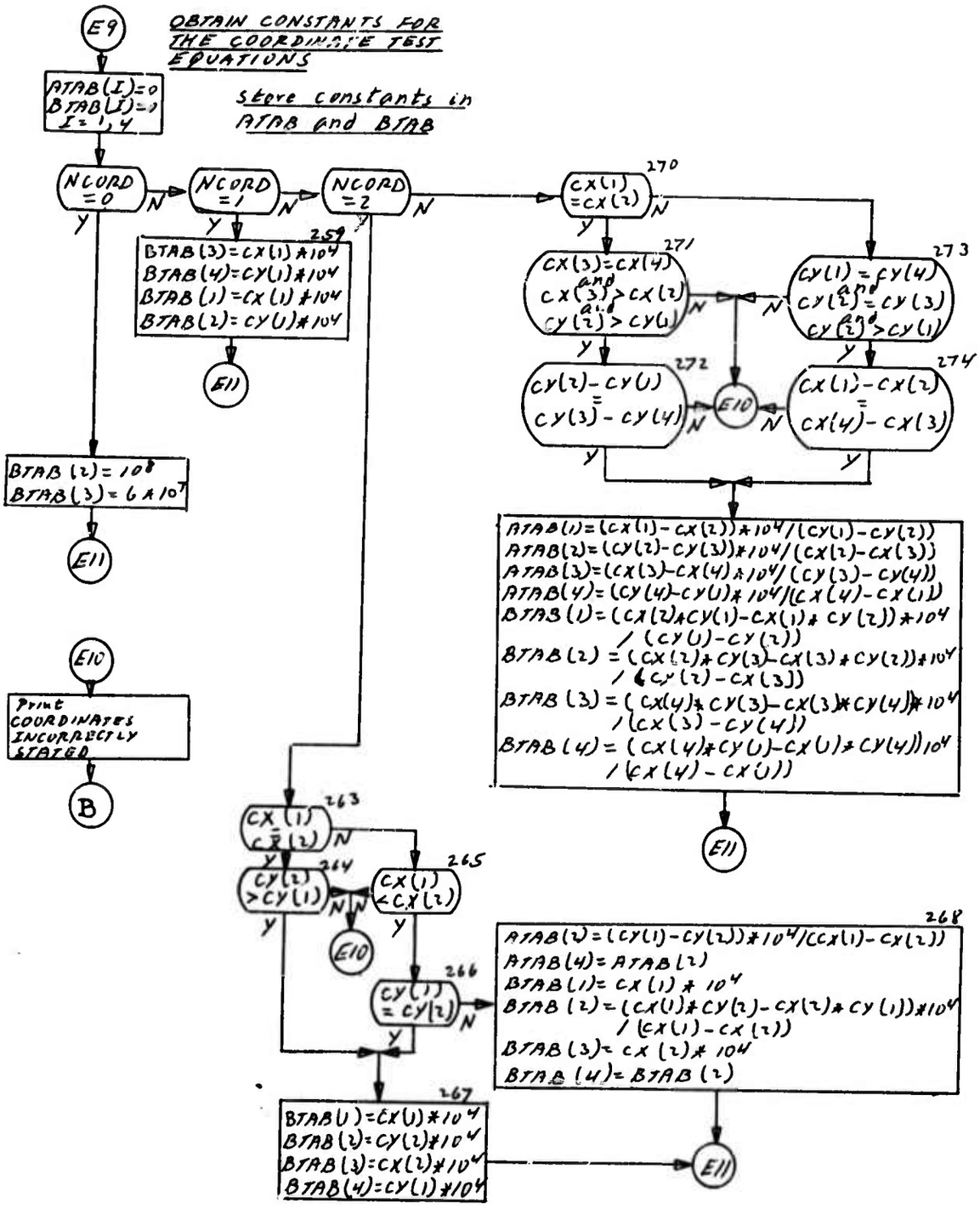


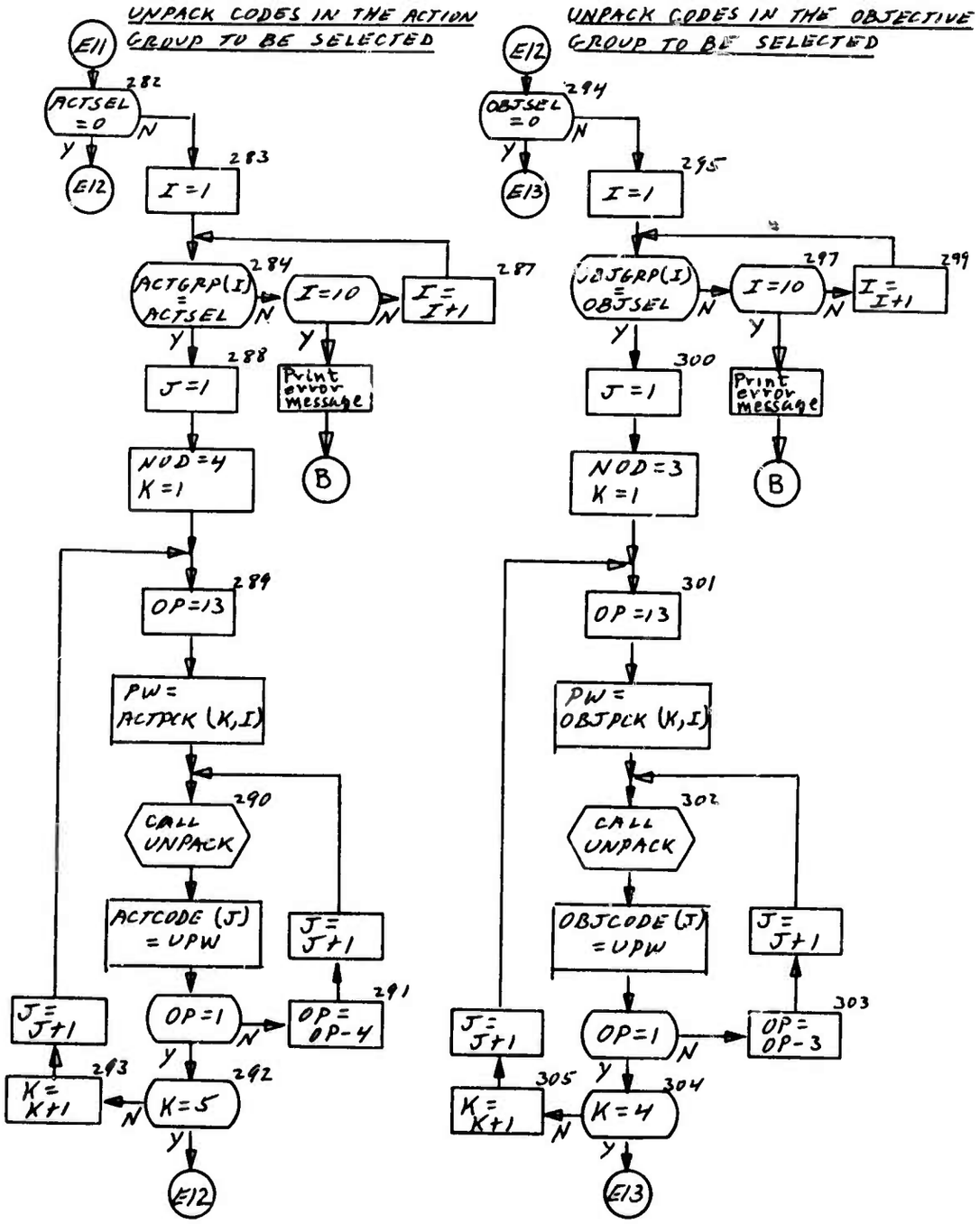
CTRANS (46,3)

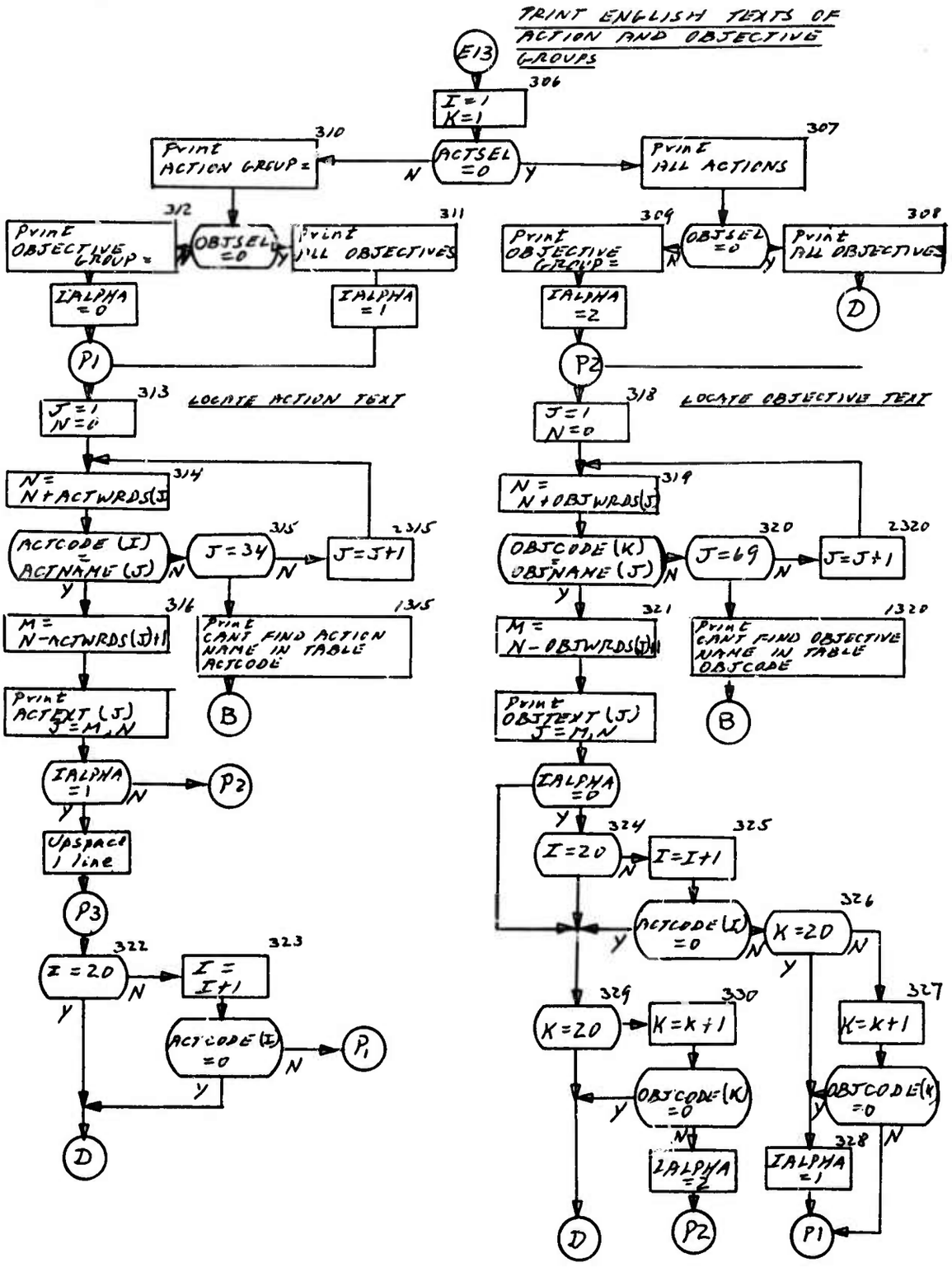
	COORDINATE LETTERS FOR SOUTH WEST NAM 100,000 METER SQUARES	DISTANCE OF SOUTHWEST CORNER RELATIVE TO SOUTHWEST CORNER OF VQ	
		X	Y
1	VQ	0	0
2	WQ	1000	0
.			
.			
.			
46	AU	4200	9000

COORDINATES OF GEOGRAPHICAL AREA SPECIFIED ON SELECT CARD

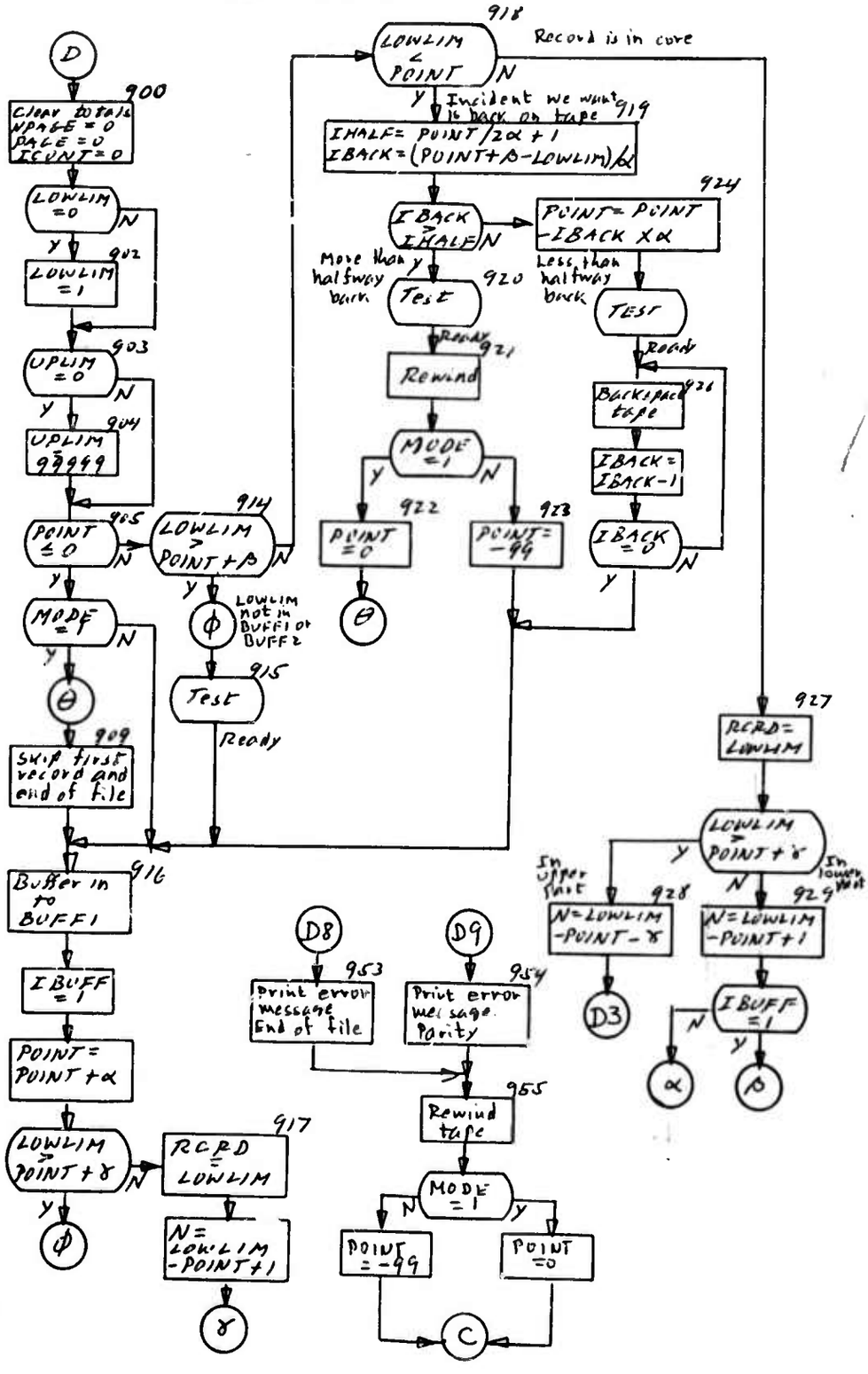
	CLETR (4)	CX (4)	CY (4)
1			
2			
3			
4			

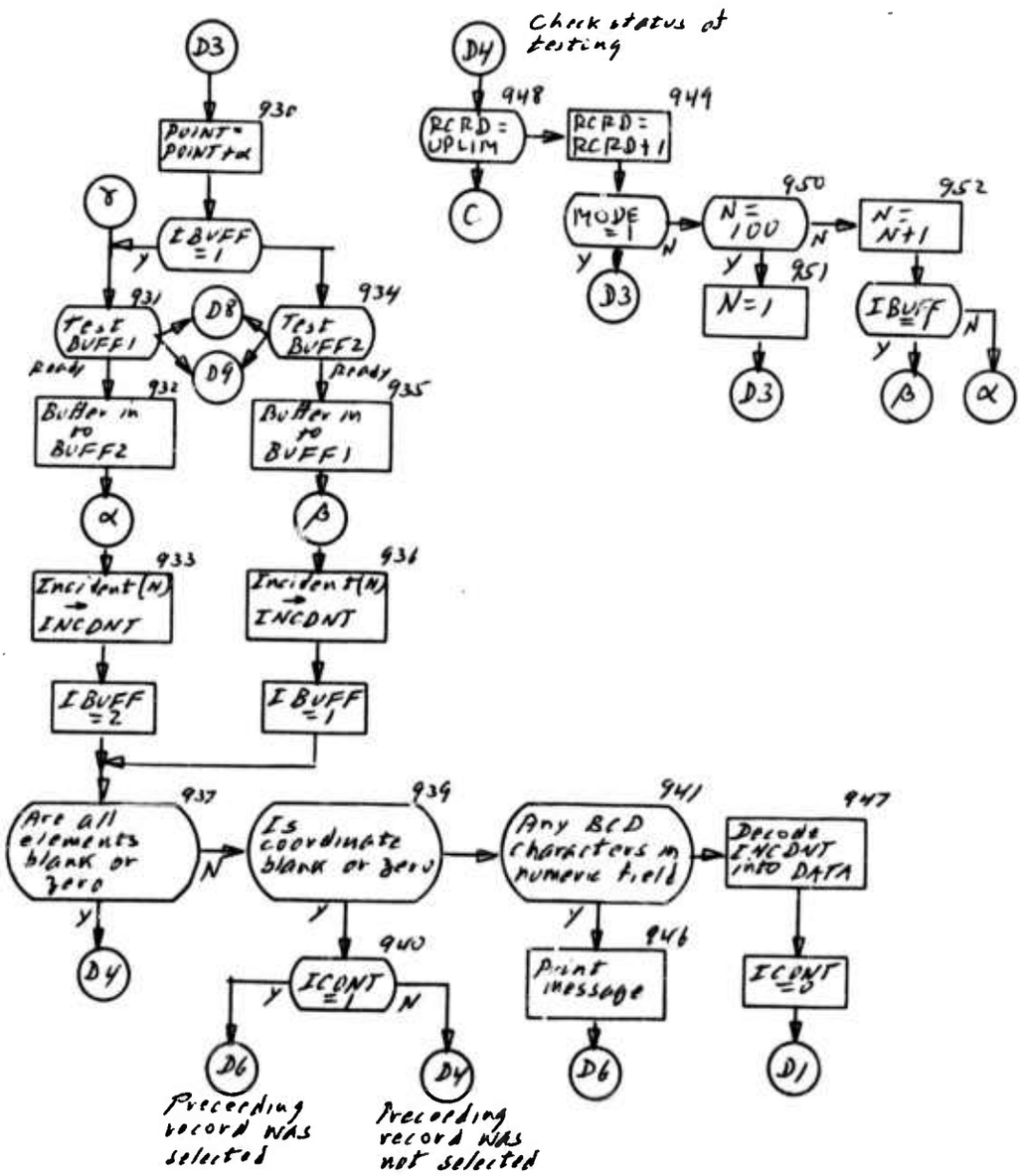

E9
OBTAIN CONSTANTS FOR THE COORDINATE TEST EQUATIONS
Store constants in ATAB and BTAB
ATAB(I)=0
BTAB(I)=0
I=1,4
NCORD =0
NCORD =1
NCORD =2
BTAB(3)=CX(1)*10^4
BTAB(4)=CY(1)*10^4
BTAB(1)=CX(1)*10^4
BTAB(2)=CY(1)*10^4
259
E11
BTAB(2)=10^8
BTAB(3)=6*10^7
E11
E10
Print COORDINATES INCORRECTLY STATED
B
CX(1) =CX(2)
270
CX(3)=CX(4) and CX(3)>CX(2) and CY(2)>CY(1)
271
CY(1)=CY(4) and CY(2)=CY(3) and CY(2)>CY(1)
273
CY(2)-CY(1) = CY(3)-CY(4)
272
CX(1)-CX(2) = CX(4)-CX(3)
274
E10
ATAB(1)=(CX(1)-CX(2))*10^4/(CY(1)-CY(2))
ATAB(2)=(CY(2)-CY(3))*10^4/(CX(2)-CX(3))
ATAB(3)=(CX(3)-CX(4)*10^4/(CY(3)-CY(4))
ATAB(4)=(CY(4)-CY(1))*10^4/(CX(4)-CX(1))
BTAB(1)=(CX(2)*CY(1)-CX(1)*CY(2))*10^4 / (CY(1)-CY(2))
BTAB(2)=(CX(2)*CY(3)-CX(3)*CY(2))*10^4 / (CY(2)-CX(3))
BTAB(3)=(CX(4)*CY(3)-CX(3)*CY(4))*10^4 / (CX(3)-CY(4))
BTAB(4)=(CX(4)*CY(1)-CX(1)*CY(4))10^4 / (CX(4)-CX(1))
E11
CX(1) =CX(2)
263
CY(2) >CY(1)
264
CX(1) <CX(2)
265
E10
CY(1) =CY(2)
266
ATAB(2)=(CY(1)-CY(2))*10^4/(CX(1)-CX(2))
ATAB(4)=ATAB(2)
BTAB(1)=CX(1)*10^4
BTAB(2)=(CX(1)*CY(2)-CX(2)*CY(1))*10^4 / (CX(1)-CX(2))
BTAB(3)=CX(2)*10^4
BTAB(4)=BTAB(2)
268
BTAB(1)=CX(1)*10^4
BTAB(2)=CY(2)*10^4
BTAB(3)=CX(2)*10^4
BTAB(4)=CY(1)*10^4
267
E11

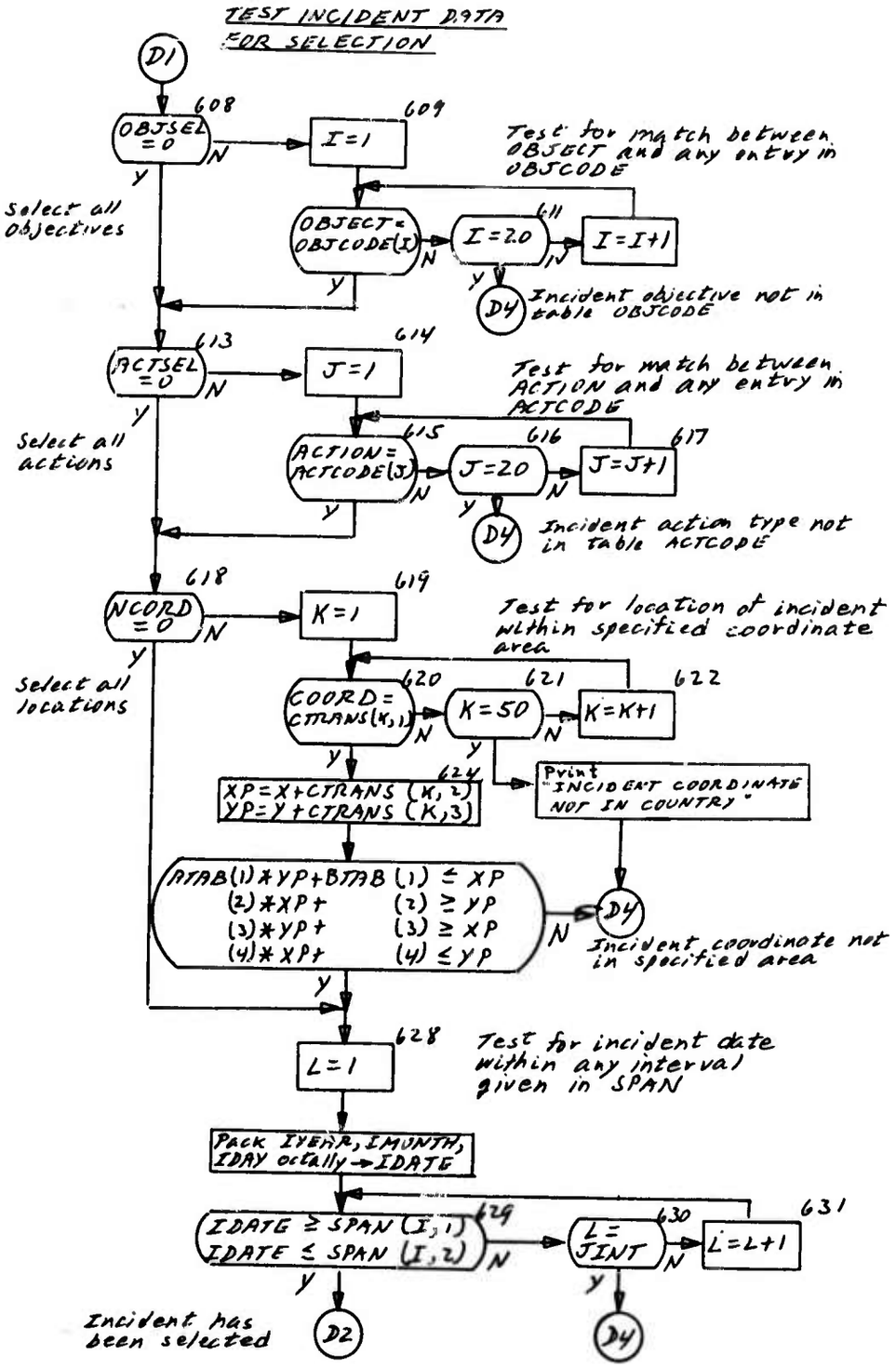

UNPACK CODES IN THE ACTION GROUP TO BE SELECTED
E11
ACTSEL = 0
282
Y
N
E12
I = 1
283
ACTGRP(I) = ACTSEL
284
N
I = 10
N
I = I+1
287
Y
Y
J = 1
288
Print error message
B
NOD = 4
K = 1
OP = 13
289
PW = ACTPCK (K,I)
CALL UNPACK
290
ACTCODE (J) = UPW
J = J+1
OP = 1
OP = OP-4
291
J = J+1
K = K+1
293
K = 5
292
E12
UNPACK CODES IN THE OBJECTIVE GROUP TO BE SELECTED
E12
OBJSEL = 0
294
E13
I = 1
295
OBJGRP(I) = OBJSEL
297
I = 10
I = I+1
299
J = 1
300
Print error message
B
NOD = 3
K = 1
OP = 13
301
PW = OBJPCK (K,I)
CALL UNPACK
302
OBJCODE (J) = UPW
J = J+1
OP = 1
OP = OP-3
303
J = J+1
K = K+1
305
K = 4
304
E13

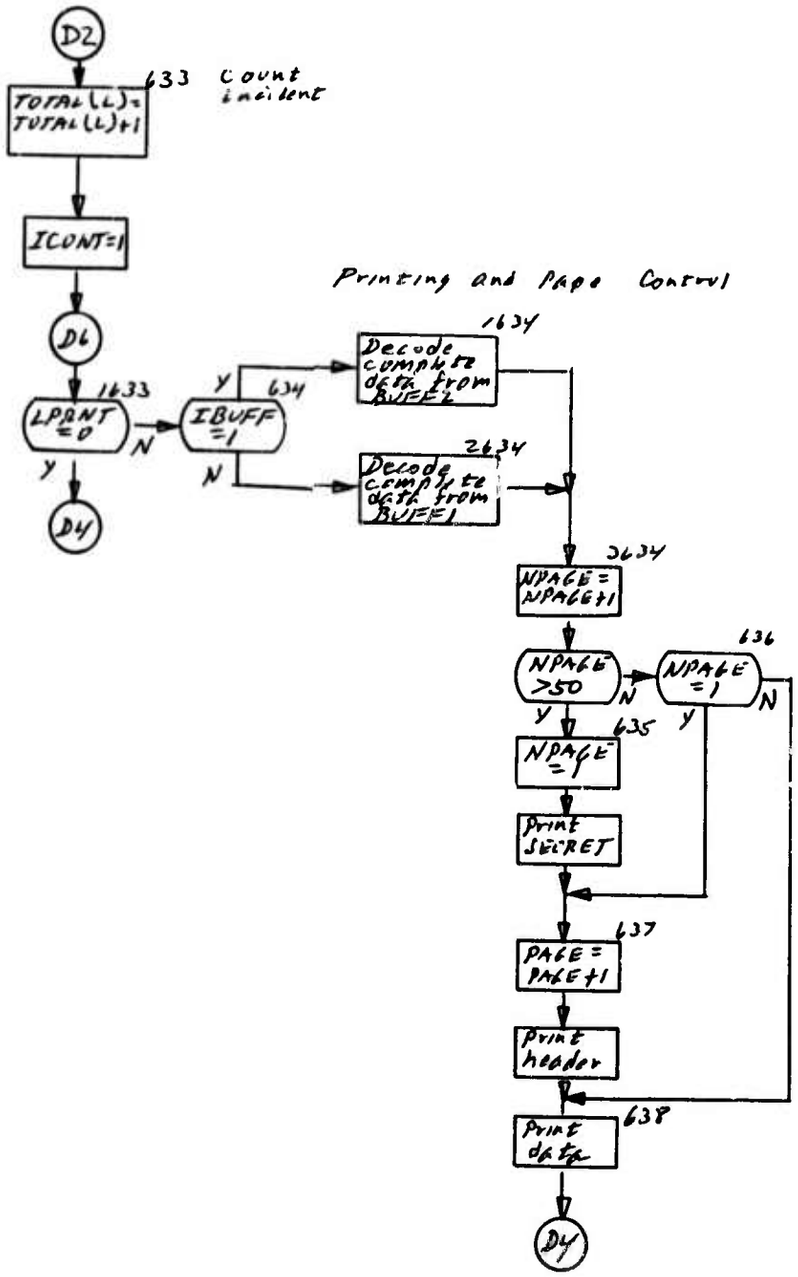

PRINT ENGLISH TEXTS OF ACTION AND OBJECTIVE GROUPS
E13
306
I=1 K=1
ACTSEL =0
N
Y
310
PRINT ACTION GROUP=
307
PRINT ALL ACTIONS
312
PRINT OBJECTIVE GROUP=
OBJSEL =0
311
PRINT ALL OBJECTIVES
309
PRINT OBJECTIVE GROUP=
OBJSEL =0
308
PRINT ALL OBJECTIVES
IALPHA =0
IALPHA =1
IALPHA =2
D
P1
P2
313
LOCATE ACTION TEXT
J=1 N=0
318
LOCATE OBJECTIVE TEXT
J=1 N=0
314
N= N+ACTWRDS(J)
319
N= N+OBJWRDS(J)
ACTCODE(I) = ACTNAME(J)
315
J=34
2315
J=J+1
OBJCODE(K) = OBJNAME(J)
320
J=69
2320
J=J+1
316
M= N-ACTWRDS(J)+1
1315
PRINT CANT FIND ACTION NAME IN TABLE ACTCODE
321
M= N-OBJWRDS(J)+1
1320
PRINT CANT FIND OBJECTIVE NAME IN TABLE OBJCODE
PRINT ACTEXT(J) J=M,N
B
PRINT OBJTEXT(J) J=M,N
IALPHA =1
P2
IALPHA =0
Upspace 1 line
P3
322
I=20
323
I= I+1
ACTCODE(I) =0
P1
324
I=20
325
I=I+1
ACTCODE(K) =0
326
K=20
329
K=20
330
K=K+1
327
K=K+1
OBJCODE(K) =0
OBJCODE(K) =0
328
IALPHA =2
IALPHA =1

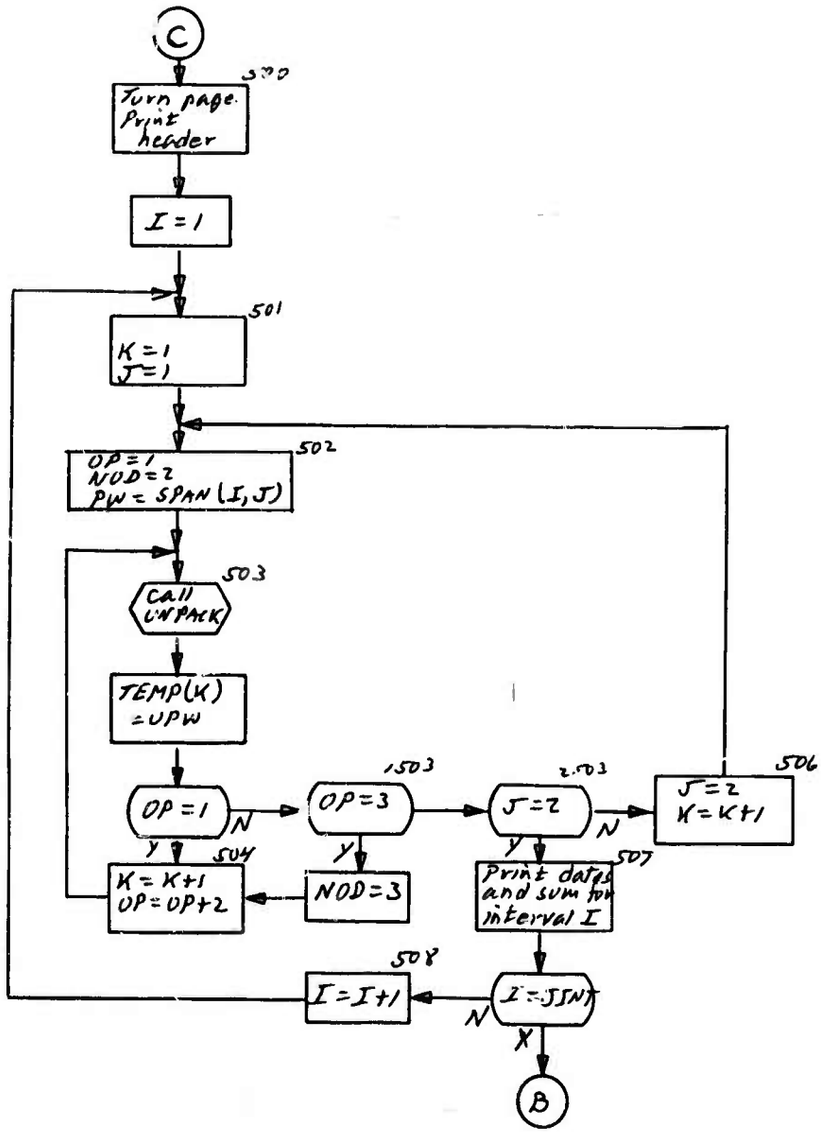
TAPE CONTROL




D3
930
POINT = POINT + 4
γ
IBUFF = 1
y
931
Test BUFF1
D8
D9
934
Test BUFF2
ready
932
Buffer in to BUFF2
ready
935
Buffer in to BUFF1
α
β
933
Incident(N) → INCDNT
936
Incident(N) → INCDNT
IBUFF = 2
IBUFF = 1
937
Are all elements blank or zero
N
939
Is coordinate blank or zero
941
Any BCD characters in numeric field
947
Decode INCDNT into DATA
y
D4
940
ICONT = 1
946
Print message
ICONT = 0
D6
D4
D6
D1
Preceding record WAS selected
Preceding record WAS not selected
D4
Check status of testing
948
RCRD = UPLIM
949
RCRD = RCRD + 1
C
MODE = 1
950
N = 100
952
N = N + 1
951
N = 1
IBUFF = 1
D3
D3
β
α


TEST INCIDENT DATA FOR SELECTION
D1
608
OBJSEL = 0
N
Y
609
I = 1
Test for match between OBJECT and any entry in OBJCODE
Select all objectives
OBJECT = OBJCODE(I)
611
I = 20
I = I+1
N
Y
D4
Incident objective not in table OBJCODE
613
ACTSEL = 0
614
J = 1
Test for match between ACTION and any entry in ACTCODE
Select all actions
ACTION = ACTCODE(J)
615
616
J = 20
617
J = J+1
Incident action type not in table ACTCODE
618
NCORD = 0
619
K = 1
Test for location of incident within specified coordinate area
Select all locations
COORD = CTRANS(K,1)
620
621
K = 50
622
K = K+1
624
XP = X + CTRANS (K,2)
YP = Y + CTRANS (K,3)
Print "INCIDENT COORDINATE NOT IN COUNTRY"
ATAB(1)*YP+BTAB(1) ≤ XP
(2)*XP+ (2) ≥ YP
(3)*YP+ (3) ≥ XP
(4)*XP+ (4) ≤ YP
Incident coordinate not in specified area
628
L = 1
Test for incident date within any interval given in SPAN
PACK IYEAR, IMONTH, IDAY octally → IDATE
629
IDATE ≥ SPAN (I,1)
IDATE ≤ SPAN (I,2)
630
L = JINT
631
L = L+1
Incident has been selected
D2


D2
633
Count incident
TOTAL(L)=TOTAL(L)+1
ICONT=1
D6
Printing and Page Control
1633
LPRNT=0
Y
N
634
IBUFF=1
Y
N
1634
Decode complete data from BUFF2
2634
Decode complete data from BUFF1
3634
NPAGE=NPAGE+1
636
NPAGE>50
N
Y
NPAGE=1
N
Y
635
NPAGE=1
Print SECRET
637
PAGE=PAGE+1
Print header
638
Print data
D4
D4


C
500
Turn page. Print header
I = 1
501
K = 1
J = 1
502
OP = 1
NOD = 2
PW = SPAN (I, J)
503
Call UNPACK
TEMP(K) = UPW
OP = 1
1503
OP = 3
2.503
J = 2
506
J = 2
K = K+1
N
Y
504
K = K+1
OP = OP+2
NOD = 3
507
Print data and sum for interval I
508
I = I+1
I = JSN
B

```
      PROGRAM JOIN
C
C THIS PROGRAM READS TAPES IN THE ASR FORMAT AND WRITES THEM 100
C INCIDENTS TO A RECORD (BMI FORMAT).
C
      DIMENSION BUFF(1500),INPUT(15)
      TYPE INTEGER BUFF
C
    1 NRCRDS=0
      REWIND 1
      REWIND 2
      L=1
      K=0
      NINCDT=0
C
C SKIP FIRST TWO RECORDS ON TAPE 2
    4 READ(2,1000)INPUT
 1000 FORMAT(15A8)
      IF(EOF,2)6,5
    5 IF(IOCHECK,2)7,8
    6 PRINT 7000
 7000 FORMAT(1H ,19HEOF ON FIRST RECORD)
      GO TO 1
    7 PRINT 7001
 7001 FORMAT(1H ,28HPARITY ERROR ON FIRST RECORD)
      GO TO 1
    8 READ(2,1000)INPUT
      IF(EOF,2)2,9
    9 PRINT 7002
 7002 FORMAT(1H ,24HNO EOF FOR SECOND RECORD)
      GO TO 1
C
C PREPARE TO LOAD BUFF
    2 DO 3 I=1,1500
    3 BUFF(I)=8H
      LB=0
      M=1
      N=15
C
C READ INCIDENT DATA FROM TAPE 2
   10 READ(2,1000)(BUFF(I),I=M,N)
      IF(EOF,2)19,11
   11 IF(IOCHECK,2)111,12
  111 PRINT 7003,L,M,N,NINCDT,NRCRDS
 7003 FORMAT(1H ,49HPARITY ERROR ON TAPE READ,L  M   N  NINCDT NRCRDS/
     127X,I1,2(1X,I3),2(2X,I5))
      GO TO 1
C
   19 IF(LB.EQ.0)17,20
   20 K=1
      GO TO 14
C
   12 LB=1
      NINCDT=NINCDT+1
      IF(N.EQ.1500)14,13
C
```

```
C MORE RECORDS CAN BE PUT IN BUFF
   13 M=M+15
      N=N+15
      GO TO 10
C
C BUFF IS FULL,WRITE IT ON TAPE 1
   14 BUFFER OUT(1,0)(BUFF(1),BUFF(1500))
      NRCRDS=NRCRDS+1
   15 IF(UNIT,1)15,16,24
   16 IF(K.EQ.0)2,17
C
C COPYING IS COMPLETE
   17 END FILE 1
      REWIND 1
      REWIND 2
      PRINT 1001,NINCDT,NRCRDS
 1001 FORMAT(1H ,24HCOPYING COMPLETE,NINCDT=,I5,10H   NRCRDS=,I5)
      READ 1003,INPUT(1)
 1003 FORMAT(A8)
      IF(INPUT(1).EQ.4HEXIT)22,23
C
   22 RETURN
C
C MORE REELS TO BE COPIED
   23 WRITE(64,1004)
 1004 FORMAT(1H ,12HCHANGE REELS)
      PAUSE
      GO TO 1
C
   24 PRINT 7004,L,M,N,NINCDT,NRCRDS
 7004 FORMAT(1H ,49HERROR ON BUFFER OUT.      L  M   N  NINCDT NRCRDS/
     127X,I1,2(1X,I3),2(2X,I5))
      GO TO 1
      END
```

```
      PROGRAM EDIT
C
C THIS PROGRAM WILL BLANK OUT SPECIFIED INCIDENTS.
C
      DIMENSION BUFFA(1500),BUFFB(1500),DELETE(7500),INPUT(10)
C
      TYPE INTEGER BUFFA,BUFFB,POSIT,DELETE,TYPE
C
    1 REWIND 1
      REWIND 2
      L=0
      DO 2 I=1,10
    2 INPUT(I)=0
      DO 3 I=1,7500
    3 DELETE(I)=0
C
C READ IN ALL EDIT CARDS
    4 READ 1000,TYPE,(INPUT(I),I=1,10)
 1000 FORMAT(A8,10(I5,2X))
      IF(TYPE.EQ.4HEDIT)5,14
    5 I=1
    6 IF(INPUT(I).EQ.0)7,9
    7 IF(I.EQ.10)4,8
    8 I=I+1
      GO TO 6
    9 IF(L.EQ.0)10,109
  109 IF(INPUT(I).GT.DELETE(L))10,13
   10 L=L+1
      IF(L.GT.7500)12,11
   11 DELETE(L)=INPUT(I)
      GO TO 7
C
   12 PRINT 7000
 7000 FORMAT(1H ,18HTOO MANY DELETIONS)
      GO TO 40
   13 PRINT 7001
 7001 FORMAT(1H ,22HDELETIONS NOT IN ORDER)
      GO TO 40
C
   14 IF(TYPE.EQ.2HDO)15,115
   15 NEDIT=L
      GO TO 17
C
  115 IF(TYPE.EQ.4HMODE)200,16
  200 MODE=INPUT(2)/10000
      IF(MODE.EQ.1)201,208
C ASR ,SCHWARTZ) FORMAT
  201 IALPH=0
      IBETA=1
      IGAMA=0
C WRITE BLANK RECORD AND EOF ON TAPE 2
      DO 1201 I=1,15
 1201 BUFFA(I)=8H
      BUFFER OUT(2,0)(BUFFA(1),BUFFA(15))
 2201 IF(UNIT,2)2201,3201,41
 3201 END FILE 2
```

```
C SKIP FIRST RECORD AND EOF
      BUFFER IN(1,0)(BUFFA(1),BUFFA(1500))
  202 IF(UNIT,1)202,205,204
  204 PRINT 2000
 2000 FORMAT(1H ,27HEOF OR PARITY ON FIRST READ)
      GO TO 40
  205 BUFFER IN(1,0)(BUFFA(1),BUFFA(1500))
  206 IF(UNIT,1)206,207,4,207
  207 PRINT 2001
 2001 FORMAT(1H ,24HNO EOF FOR SECOND RECORD)
      GO TO 40
C
C BMI FORMAT
  208 IALPH=-99
      IBETA=100
      IGAMA=99
      GO TO 4
C
   16 PRINT 7002
 7002 FORMAT(1H ,22HUNRECOGNIZED CARD TYPE)
      GO TO 40
C
C ALL EDIT CARDS ARE IN.
   17 POSIT =IALPH
      INIT=0
      L=1
      GO TO 19
C
   18 IF(MODE.EQ.1)118,218
  118 BUFFER OUT(2,0)(BUFFB(1),BUFFB(15))
      GO TO 19
  218 BUFFER OUT(2,0)(BUFFB(1),BUFFB(1500))
   19 BUFFER IN (1,0)(BUFFA(1),BUFFA(1500))
      K=0
      GO TO 21
   20 IF(MODE.EQ.1)120,220
  120 BUFFER OUT(2,0)(BUFFA(1),BUFFA(15))
      GO TO 320
  220 BUFFER OUT(2,0)(BUFFA(1),BUFFA(1500))
  320 BUFFER IN(1,0)(BUFFB(1),BUFFB(1500))
      K=1
C
   21 IF(UNIT,1)21,23,38,22
   22 PRINT 7003
 7003 FORMAT(1H ,25HPARITY ERROR ON BUFFER IN)
      GO TO 39
C
   23 IF(NEDIT.EQ.0)34,24
   24 POSIT=POSIT+IBETA
   25 IF(DELETE(L).GT.(POSIT+IGAMA))34,26
C
C SET INDICES AND DELETE INCIDENT
   26 M=(DELETE(L)-POSIT)*15+1
      N=M+14
      IF(K.EQ.0)27,29
   27 DO 28 J=M,N
```

```
   28 BUFFA(J)=8H
      GO TO 31
   29 DO 30 J=M,N
   30 BUFFB(J)=8H
C
   31 IF(L.EQ.NEDIT)32,33
   32 NEDIT=0
      GO TO 36
   33 L=L+1
      GO TO 25
C
C NO MORE TO BE DELETED IN THIS RECORD
   34 IF(INIT.EQ.0)35,36
   35 INIT=1
      GO TO 20
   36 IF(UNIT,2)36,37,41
   37 IF(K.EQ.0)20,18
C
C EOF ON TAPE READ
   38 IF(UNIT,2)38,39,41
   39 END FILE 2
      REWIND 2
   40 REWIND 1
      RETURN
C
   41 PRINT 7004
 7004 FORMAT(1H ,19HERROR ON BUFFER OUT)
      GO TO 39
      END
```

```
      PROGRAM SELECT
C
C THIS PROGRAM READS DATA FROM TAPE IN EITHER ASR OR BMI FORMAT,SELECTS
C SPECIFIED CLASSES OF DATA AND COUNTS THEM
C
      COMMON/9/PW,OP,NOD,UPW
C
      DIMENSION INPUT(10),OBJCODE(20),ACTCODE(20),OBJGRP(10),ACTGRP(10),
     1OBJPCK(4,10),ACTPCK(5,10),CLETR(4),CX(4),CY(4),SPAN(72,2),
     2CTRANS(46,3),ATAB(4),BTAB(4),TEMP(6)
      DIMENSION TOTAL(72)
      DIMENSION ACTNAME(34),ACTWRDS(34),ACTEXT(71)
      DIMENSION OBJNAME(69),OBJWRDS(69),OBJTXT(142)
      DIMENSION BUFF1(1500),BUFF2(1500),OUT(24),INCONT(15),TEST(28)
C
      TYPE INTEGER GROUP,OBJCODE,ACTCODE,OBJGRP,ACTGRP,OBJPCK,ACTPCK,
     1DAY,YEAR,DELAY,CLETR,CX,CY,ACTSEL,OBJSEL,PRNTFRM,ACTION,OBJECT,
     2COORD,X,Y,SPAN,YEAR1,DAY1,YEAR2,DAY2,CTRANS,ATAB,BTAB,TEMP,OP,
     3PW,UPW,TOTAL
      TYPE INTEGER ACTNAME,ACTWRDS,ACTEXT,OBJNAME,OBJWRDS,OBJTXT
      TYPE INTEGER OUT,PAGE,UPLIM,BUFF1,BUFF2,RCRD
      TYPE INTEGER POINT,TEST
C
      DATA(OBJNAME=10,11,12,13,14,15,16,17,18,19,20,21,22,23,30,31,32,
     133,34,35,36,37,38,39,40,41,42,43,44,45,50,51,52,53,54,55,56,57,
     258,60,61,62,63,64,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,
     385,86,90,91,92,93,94,95,96,97)
C
      DATA(OBJWRDS=2,2,1,2,2,2,2,3,1,2,2,4,3,3,1,2,2,3,3,4,2,2,2,2,3,3,
     1 2,2,3,2,2,1,1,1,1,1,2,2,1,1,1,2,1,1,3,3,1,2,3,3,3,1,2,3,3,3,2,
     2 2,2,3,2,2,2,2,1,3,2,1)
C
      DATA(OBJTXT=          8HA MILITA,8HRY POST ,8HAN OUTPO,8HST      ,
     18HA BASE  ,8HA JUNK B,8HASE     ,8HAN AIRFI,8HELD     ,8HA WATCHT,
     28HOWER    ,8HA BLOCKH,8HOUSE    ,8HMILITARY,8H FACILIT,8HIES     ,
     38HA CAMP  ,8HA BIVOUA,8HC       ,8HA NRL HA,8HMLET    ,8HA NRL HA,
     48HMLET UND,8HER CONST,8HRUCTION ,8HA SECURI,8HTY FENCE,8H(S)     ,
     58HNRL HAML,8HET FACIL,8HITIES   ,8HA HAMLET,8HA VILLAG,8HE       ,
     68HA VILLAG,8HE OFFICE,8HA DISTRI,8HCT OFFIC,8HE       ,8HA PROVIN,
     78HCE OFFIC,8HE       ,8HA LAND D,8HEVELOPME,8HNT CENTE,8HR      ,
     88HA HOUSE(,8HS)      ,8HA BUILDI,8HNG(S)   ,8HA CHURCH,8H(S)    ,
     98HCIVIL FA,8HCILITIES,8HAN ARMED,8H HELICOP,8HTER     ,8HAN UNARM,
     18HED HELIC,8HOPTER   ,8HHELICOPT,8HER(S)   ,8HA COMBAT,8HAIRCRAFT,
     28HA SUPPOR,8HT AIRCRA,8HFT      ,8HAN AIRCR,8HAFT     ,8HA MOTOR ,
     38HCONVOY  ,8HA TRUCK ,8HA BUS   ,8HAN AUTO ,8HA JEEP  ,8HA TRAIN ,
     48HA CART  ,8HA VEHICL,8HE       ,8HAN ARMOR,8HED CAR  ,8HA SAMPAN,
     58HA JUNK  ,8HA BOAT  ,8HA NAVAL ,8HCRAFT   ,8HA SHIP  ,8HA ROAD  ,
     68HA VEHICU,8HLAR GRID,8HGE      ,8HA RAILRO,8HAD BRIDG,8HE       ,
     78HA BRIDGE,8HRAILROAD,8H TRACKS ,8HRAILROAD,8H FACILIT,8HIES     ,
     88HCOMMUNIC,8HATION LI,8HNES     ,8HCOMMUNIC,8HATION FA,8HCILITIES,
     98HA CANAL ,8HWATERWAY,8HS       ,8HA VILLAG,8HE OFFICI,8HAL(S)   ,
     18HA HAMLET,8H OFFICIA,8HL(S)    ,8HA CIVIL ,8HOFFICIAL,8H(S)     ,
     28HA CIVILI,8HAN(S)   ,8HINHABITA,8HNTS     ,8HA MILITA,8HRY UNIT ,
     38HMILITARY,8H PERSONN,8HEL      ,8HFIREARMS,8H/AMMO   ,8HFOODSTUF,
     48HFS      ,8HLIVESTOC,8HK       ,8HMEDICAL ,8HSUPPLIES,8HAN AREA ,
     58HCONSTRUC,8HTION EQU,8HIPMENT  ,8HPOWER LI,8HNES     ,8HCULVERT )
```

```
C
      DATA(ACTNAME=  2RA1,2RA2,2RA3,2RA4,2RE1,2RE2,2RE3,2RH1,2RH2,2RH3,
     12RH4,2RH5,2RM1,2RM2,2RM3,2RM4,2RM5,2RM6,2RM7,2RM8,2RP1,2RP2,2RP3,
     22RP4,2RP5,2RS1,2RS2,2RS3,2RT1,2RT2,2RT3,2RT4,2RT5,2RT6)
C
      DATA(ACTWRDS=5,1,1,1,2,2,1,4,4,1,1,1,1,1,1,2,1,1,1,2,5,2,1,3,2,5,
     12,4,5,2,2,1,2,1)
C
      DATA(ACTEXT=           8HPERFORME,8HD AGGREG,8HATED ARM,8HED ATTAC,
     18HKS       ,8HATTACKED,8HAMBUSHED,8HENGAGED ,8HCOVERTLY,8H ENTERED,
     28HOVERTLY ,8HENTERED ,8HENTERED ,8HPERFORME,8HD AGGREG,8HATED HAR,
     38HASSMENTS,8HCONDUCTE,8HD HARASS,8HING FIRE,8HON       ,8HBOMBED  ,
     48HHARASSED,8HFIRED ON,8HMINED   ,8HSTOPPED ,8HBLOCKED ,8HDESTROYE,
     58HD        ,8HDAMAGED ,8HSTOLE   ,8HBURNED  ,8HBOOBY TR,8HAPPED   ,
     68HPERFORME,8HD AGGREG,8HATED ACT,8HS OF PRO,8HPAGANDA ,8HPROPAGAN,
     78HDIZED    ,8HLECTURED,8HDISTRIBU,8HTED LEAF,8HLETS TO ,8HDEMONSTR,
     88HATED TO ,8HPERFORME,8HD AGGREG,8HATED ACT,8HS OF SAB,8HOTAGE   ,
     98HSABOTAGE,8HD       ,8HSABOTAGE,8HD (WITH ,8HEXPLOSIV,8HES)     ,
     18HPERFORME,8HD AGGREG,8HATED ACT,8HS OF TER,8HRORISM  ,8HTERRORIZ,
     28HED       ,8HASSASSIN,8HATED    ,8HMURDERED,8HKIDNAPPE,8HD        ,
     38HCAPTURED)
C
      DATA(CTRANS=   2RVQ,2RWQ,2RVR,2RWR,2RXR,2RVS,2RWS,2RXS,2RYS,2RZS,
     12RAM,2RWT,2RXT,2RYT,2RZT,2RAN,2RBN,2RCN,2RXU,2RYU,2RZU,2RAP,2RBP,
     22RCP,2RYV,2RZV,2RAQ,2RBQ,2RCQ,2RYA,2RZA,2RAR,2RBR,2RCR,2RYB,2RZB,
     32RAS,2RBS,2RYC,2RZC,2RAT,2RBT,2RXD,2RYD,2RZD,2RAU,
     8   0,1000,   0,1000,2000,   0,1000,2000,3000,4000,4285,1000,2000,
     93000,4000,4276,4551,5551,2000,3000,4000,4266,4531,5531,3000,4000,
     14255,4510,5510,3000,4000,4243,4486,5486,3000,4000,4230,4460,3000,
     24000,4216,4432,2000,3000,4000,4200,
     3   0,   0,3(1000),6(2000),7(3000),6(4000),5(5000),2(6000),3(1000),
     42(7000),2(2000),2(8000),2(3000),4(9000))
C
    1 JACT=0
      JOBJ=0
      RCRD=0
    2 READ 1000,INPUT
 1000 FORMAT(10A8)
    3 IF(INPUT(1).EQ.5HVCACT)100,4
    4 IF(INPUT(1).EQ.5HVCOBJ)107,5
    5 IF(INPUT(1).EQ.6HSELECT)200,7
    7 IF(INPUT(1).EQ.5HPAUSE)8,9
    8 REWIND 1
      WRITE(64,7006)
 7006 FORMAT(1H ,12HCHANGE REELS)
      PAUSE
      GO TO 11
    9 IF(INPUT(1).EQ.4HMODE)10,6
   10 DECODE(8,1016,INPUT(2))MODE
 1016 FORMAT(7X,I1)
   11 REWIND 1
      IF(MODE.EQ.1)12,13
   12 POINT=0
      IALPH=1
      IBETA=1
      IGAMA=0
```

```
      GO TO 2
   13 POINT=-99
      IALPH=100
      IBETA=199
      IGAMA=99
      GO TO 2
    6 RETURN
C
C A VCACT CARD HAS BEEN READ
  100 DECODE (63,1001,INPUT(2))GROUP,(ACTCODE(I),I=1,20)
 1001 FORMAT(I2,1X,20(R2,1X))
      JACT=JACT+1
      IF(JACT.GT.10)101,102
  101 JACT=1
  102 ACTGRP(JACT)=GROUP
C PACK CODES FROM ACTCODE INTO ACTPCK
      IACT=1
      K=0
      I=4
      DO 1102 L=1,5
 1102 ACTPCK(L,   JACT)=0
      DO 1104 L=1,20
      IF(ACTCODE(L).EQ.6060B)1103,1104
 1103 ACTCODE(L)=0
 1104 CONTINUE
  103 K=K+1
  104 ACTPCK(IACT,JACT)=ACTPCK(IACT,JACT)*4096+ACTCODE(K)
      IF(K.EQ.I)105,103
  105 IF(I.EQ.20)  2,106
  106 I=I+4
      IACT=IACT+1
      GO TO 103
C
C A VCOBJ CARD HAS BEEN READ
  107 DECODE (63,1050,INPUT(2))GROUP,(OBJCODE(I),I=1,20)
 1050 FORMAT(I2,1X,20(I2,1X))
      JOBJ=JOBJ+1
      IF(JOBJ.GT.10)108,109
  108 JOBJ=1
  109 OBJGRP(JOBJ)=GROUP
C PACK CODES FROM OBJCODE INTO OBJPCK
      IOBJ=1
      K=0
      I=5
      DO 1109 L=1,4
 1109 OBJPCK(L   ,JOBJ)=0
      DO 1111 L=1,20
      IF(OBJCODE(L).EQ.6060B)1111,1112
 1111 OBJCODE(L)=0
 1112 CONTINUE
  110 K=K+1
  111 OBJPCK(IOBJ,JOBJ)=OBJPCK(IOBJ,JOBJ)*512+OBJCODE(K)
      IF(K.EQ.I)112,110
  112 IF(I.EQ.20)  2,113
  113 I=I+5
      IOBJ=IOBJ+1
```

```
      GO TO 110
C
C A SELECT CARD HAS BEEN READ
  200 DO 1200 I=1,20
      ACTCODE(I)=0
 1200 OBJCODE(I)=0
      DECODE(64,1002,INPUT(2))DAY,MONTH,YEAR,DELAY,INTRVL,NINTRVL,LMINUS
     1,LPLUS,LCALNDR,CLETR(1),CX(1),CY(1),CLETR(2),CX(2),CY(2),CLETR(3),
     2CX(3),CY(3),CLETR(4),CX(4),CY(4),ACTSEL,OBJSEL,LPRNT,PRNTFRM
     3,LOWLIM,UPLIM
 1002 FORMAT(6I2,3I1,4(R2,2I3),2I2,1X,2I1,2I5)
      PRINT 2000,DAY,MONTH,YEAR,DELAY,INTRVL,NINTRVL,LMINUS,LPLUS,
     1LCALNDR,( CLETR(I),CX(I),CY(I),I=1,4),ACTSEL,OBJSEL,LPRNT,PRNTFRM
     2,LOWLIM,UPLIM
 2000 FORMAT(1H1,*  DATE  DELAY INTRVL NINTRVL LMINUS LPLUS LCALNDR
     1          COORDINATES                ACTSEL OBJSEL LPRNT PRNTFRM LO
     2WLIM UPLIM*/
     31X,I2,2(1H/,I2),2X,6(I2,5X),4(R2,2I3,1X),2X,4(I2,5X),2I5//)
C
C SET THE DATE INTERVALS
      IF(MONTH.EQ.0.AND.DAY.EQ.0)201,204
  201 SPAN(1,1)=(  00*64+1)*64 +1
  202 SPAN(1,2)=(  99*64+12)*64+31
  203 JINT=1
      GO TO 245
  204 IF(LMINUS.EQ.0)205,211
  205 IF(LPLUS.EQ.0)206,208
  206 SPAN(1,1)=(YEAR*64+MONTH)*64+DAY
  207 SPAN(1,2)=SPAN(1,1)
      GO TO 203
  208 IF(INTRVL.EQ.0.OR.INTRVL.EQ.99)209,210
  209 SPAN(1,1)=(YEAR*64+MONTH)*64+DAY
      GO TO 202
  210 JINT=NINTRVL
      YEAR1=YEAR
      MONTH1=MONTH
      DAY1=DAY
      GO TO 220
  211 IF(LPLUS.EQ.0)212,1212
  212 IF(INTRVL.EQ.0.OR.INTRVL.EQ.99)213,214
  213 SPAN(1,1)=(00*64+01)*64+01
      I=1
      JINT=1
      YEAR2=YEAR
      MONTH2=MONTH
      DAY2=DAY
      GO TO 225
 1212 JINT=NINTRVL*2
      GO TO 215
  214 JINT=NINTRVL
  215 I=1
      YEAR1=YEAR
      MONTH1=MONTH
      DAY1=DAY
  216 MONTH1=MONTH1-INTRVL
      IF(MONTH1.LE.0)217,218
```

```
  217 MONTH1=MONTH1+12
      YEAR1=YEAR1-1
  218 IF(I.EQ.NINTRVL)220,219
  219 I=I+1
      GO TO 218
C
C FIND DATES OF JINT INTERVALS STARTING AT YEAR1,MONTH1,DAY1
  220 I=1
C PACK START OF INTERVAL IN SPAN
  221 SPAN(I,1)=(YEAR1*64+MONTH1)*64+DAY1
C INCREMENT THE DATE
      YEAR2=YEAR1
      MONTH2=MONTH1
      DAY2=DAY1
      MONTH2=MONTH2+INTRVL
  222 IF(MONTH2.GT.12)223,224
  223 MONTH2=MONTH2-12
      YEAR2=YEAR2+1
      GO TO 222
C DATE2 IS NOW THE START OF NEXT INTERVAL
  224 YEAR1=YEAR2
      MONTH1=MONTH2
      DAY1=DAY2
C FIND DAY BEFORE END OF DATE2.IT WILL BE THE END OF THE INTERVAL.
  225 IF(DAY2.EQ.1)226,240
  226 IF(MONTH2.EQ.1)227,231
  227 IF(YEAR2.EQ.0)228,229
  228 YEAR2=99
      GO TO 230
  229 YEAR2=YEAR2-1
  230 MONTH2=12
      DAY2=31
      GO TO 241
  231 IF(MONTH2.EQ.3)232,236
  232 IF( YEAR2*10/4-YEAR2/4*10.EQ.0)233,234
  233 DAY2=29
      GO TO 235
  234 DAY2=28
  235 MONTH2=2
      GO TO 241
  236 IF(MONTH2.EQ.5.OR.MONTH2.EQ.7.OR.MONTH2.EQ.10.OR.MONTH2.EQ.12)
     1237,238
  237 DAY2=30
      GO TO 239
  238 DAY2=31
  239 MONTH2=MONTH2-1
      GO TO 241
  240 DAY2=DAY2-1
C PUT DATE ENDING INTERVAL IN SPAN
  241 SPAN(I,2)=(YEAR2*64+MONTH2)*64+DAY2
      IF(I.EQ.JINT)245,242
  242 IF(I.EQ.72)243,244
  243 PRINT 1003
 1003 FORMAT(1H ,18HTOO MANY INTERVALS)
      GO TO 2
  244 I=I+1
```

```
      GO TO 221
C TRANSFORM COORDINATES FROM ALPHABETIC TO NUMERIC
  245 I=1
  246 IF(CLETR(I).EQ.60608.OR.CLETR(I).EQ.0)254,247
  247 J=1
  248 IF(CLETR(I).EQ.CTRANS(J,1))252,249
  249 IF(J.EQ.46)250,251
  250 PRINT 1004
 1004 FORMAT(1H ,42HCOORDINATE LETTERS ARE NOT IN CTRANS TABLE)
      GO TO 2
  251 J=J+1
      GO TO 248
  252 CX(I)=CX(I)+CTRANS(J,2)
      CY(I)=CY(I)+CTRANS(J,3)
      IF(I.EQ.4)1253,253
  253 I=I+1
      GO TO 246
 1253 NCORD=4
      GO TO 255
  254 NCORD=I-1
C NCORD GIVES THE NUMBER OF COORDINATES.IT MAY BE ZERO.
C GET THE CONSTANTS FOR THE COORDINATE TEST EQUATIONS
  255 DO 256 I=1,4
      ATAB(I)=0
  256 BTAB(I)=0
      IF(NCORD.EQ.0)257,258
C COORDINATE EQUATION CONSTANTS FOR ALL POINTS
  257 BTAB(2)=100000000
      BTAB(3)= 60000000
      GO TO 282
  258 IF(NCORD.EQ.1)259,262
C COORDINATE EQUATION CONSTANTS FOR ONE POINT
  259 BTAB(3)=CX(1)*10000
  260 BTAB(4)=CY(1)*10000
  261 BTAB(1)=CX(1)*10000
      BTAB(2)=CY(1)*10000
      GO TO 282
  262 IF(NCORD.EQ.2)263,270
C COORDINATE EQUATION CONSTANTS FOR TWO POINTS
  263 IF(CX(1).EQ.CX(2))264,265
  264 IF(CY(2).GT.CY(1))267,275
  265 IF(CX(1).LT.CX(2))266,275
  266 IF(CY(1).EQ.CY(2))267,268
  267 BTAB(1)=CX(1)*10000
      BTAB(2)=CY(2)*10000
      BTAB(3)=CX(2)*10000
      BTAB(4)=CY(1)*10000
      GO TO 282
  268 ATAB(2)= (CY(1)-CY(2))*10000/(CX(1)-CX(2))
      ATAB(4)= ATAB(2)
      BTAB(1)=CX(1)*10000
      BTAB(2)= (CX(1)*CY(2)-CX(2)*CY(1))*10000/(CX(1)-CX(2))
      BTAB(3)=CX(2)*10000
      BTAB(4)=BTAB(2)
      GO TO 282
C COORDINATE EQUATION CONSTANTS FOR FOUR POINT AREA
```

```
  270 IF(CX(1).EQ.CX(2))271,273
  271 IF(CX(3).EQ.CX(4).AND.CX(3).GT.CX(2).AND.CY(2).GT.CY(1))272,275
  272 IF((CY(2)-CY(1)).EQ.(CY(3)-CY(4)))277,275
  273 IF(CY(1).EQ.CY(4).AND.CY(2).EQ.CY(3).AND.CY(2).GT.CY(1))274,275
  274 IF((CX(1)-CX(2)).EQ.(CX(4)-CX(3)))277,275
  275 PRINT 276
  276 FORMAT(1H ,30HCOORDINATES INCORRECTLY STATED)
      GO TO 2
  277 ATAB(1)=  (CX(1)-CX(2))*10000/(CY(1)-CY(2))
      ATAB(2)=  (CY(2)-CY(3))*10000/(CX(2)-CX(3))
      ATAB(3)=  (CX(3)-CX(4))*10000/(CY(3)-CY(4))
      ATAB(4)=  (CY(4)-CY(1))*10000/(CX(4)-CX(1))
      BTAB(1)=  (CX(2)*CY(1)-CX(1)*CY(2))*10000/(CY(1)-CY(2))
      BTAB(2)=  (CX(2)*CY(3)-CX(3)*CY(2))*10000/(CX(2)-CX(3))
      BTAB(3)=  (CX(4)*CY(3)-CX(3)*CY(4))*10000/(CY(3)-CY(4))
      BTAB(4)=  (CX(4)*CY(1)-CX(1)*CY(4))*10000/(CX(4)-CX(1))
C OBTAIN CODES FOR ACTIONS TO BE SELECTED.IF ACTSEL=0 TAKE ALL ACTIONS
  282 IF(ACTSEL.EQ.0)294,283
  283 I=1
  284 IF(ACTGRP(I).EQ.ACTSEL)288,285
  285 IF(I.EQ.10)286,287
  286 PRINT 1005
 1005 FORMAT(1H ,33HGROUP CALLED FOR IS NOT IN ACTGRP)
      GO TO 2
  287 I=I+1
      GO TO 284
  288 J=1
      NOD=4
      K=1
  289 OP=13
      PW=ACTPCK(K,I)
  290 CALL UNPACK
      ACTCODE(J)=UPW
      IF(OP.EQ.1 )292,291
  291 OP=OP-4
      J=J+1
      GO TO 290
  292 IF(K.EQ.5)294,293
  293 K=K+1
      J=J+1
      GO TO 289
C OBTAIN CODES FOR OBJECTIVES TO BE SELECTED.IF OBJSEL=0 TAKE ALL
  294 IF(OBJSEL.EQ.0)306,295
  295 I=1
  296 IF(OBJGRP(I).EQ.OBJSEL)300,297
  297 IF(I.EQ.10)298,299
  298 PRINT 1006
 1006 FORMAT(1H ,33HGROUP CALLED FOR IS NOT IN OBJGRP)
      GO TO 2
  299 I=I+1
      GO TO 296
  300 J=1
      NOD=3
      K=1
  301 OP=13
      PW=OBJPCK(K,I)
```

```
  302 CALL UNPACK
      OBJCODE(J)=UPW
      IF(OP.EQ.1 )304,303
  303 OP=OP-3
      J=J+1
      GO TO 302
  304 IF(K.EQ.4)306,305
  305 K=K+1
      J=J+1
      GO TO 301
C PRINT LISTS OF ACTIONS AND OBJECTIVES TO BE SELECTED
  306 I=1
      K=1
      IF(ACTSEL.EQ.0)307,310
  307 PRINT 1008
 1008 FORMAT(1H*,18X,11HALL ACTIONS)
      IF(OBJSEL.EQ.0)308,309
  308 PRINT 1009
 1009 FORMAT(1H ,68X,14HALL OBJECTIVES)
      GO TO 900
  309 PRINT 1010,OBJSEL
 1010 FORMAT(1H ,68X,18HOBJECTIVE GROUP = ,I2/)
      IALPHA=2
      GO TO 318
  310 PRINT 1007,ACTSEL
 1007 FORMAT(1H*,15HACTION GROUP = ,I2)
      IF(OBJSEL.EQ.0)311,312
  311 PRINT 1009
      IALPHA=1
      GO TO 313
  312 PRINT 1010,OBJSEL
      IALPHA=0
      GO TO 313
C LOCATE AND PRINT ACTION TEXT.
  313 J=1
      N=0
  314 N=N+ACTWRDS(J)
      IF(ACTCODE(I).EQ.ACTNAME(J))316,315
  315 IF(J.EQ.34)1315,2315
 1315 PRINT 7001,ACTNAME(J)
 7001 FORMAT(1H ,22HCANT FIND ACTION NAME ,R2,17H IN TABLE ACTCODE)
      GO TO 2
 2315 J=J+1
      GO TO 314
  316 M=N-ACTWRDS(J)+1
      PRINT 1011,(ACTEXT(J),J=M,N)
 1011 FORMAT(1H*,18X,5A8)
      IF(IALPHA.EQ.1)317,318
  317 PRINT 1018
 1018 FORMAT(1H )
      GO TO 322
C LOCATE AND PRINT OBJECTIVE TEXT
  318 J=1
      N=0
  319 N=N+OBJWRDS(J)
      IF(OBJCODE(K).EQ.OBJNAME(J))321,320
```

```
  320 IF(J.EQ.69)1320,2320
 1320 PRINT 7002,OBJNAME(J)
 7002 FORMAT(1H ,25HCANT FIND OBJECTIVE NAME ,I2,17H IN TABLE OBJCODE)
      GO TO 2
 2320 J=J+1
      GO TO 319
  321 M=N-OBJWRDS(J)+1
      PRINT 1019,(OBJTXT (J),J=M,N)
 1019 FORMAT(1H ,68X,5A8)
      IF(IALPHA.EQ.0)324,329
C TEST FOR FURTHER PRINTING OF ACTION TEXT
  322 IF(I.EQ.20)900,323
  323 I=I+1
      IF(ACTCODE(I).EQ.0)900,313
C TEST FOR FURTHER PRINTING OF ACTION AND OBJECTIVE TEXTS
  324 IF(I.EQ.20)329,325
  325 I=I+1
      IF(ACTCODE(I).EQ.0)329,326
  326 IF(K.EQ.20)328,327
  327 K=K+1
      IF(OBJCODE(K).EQ.0)328,313
  328 IALPHA=1
      GO TO 313
C TEST FOR FURTHER PRINTING OF OBJECTIVE TEXT
  329 IF(K.EQ.20)900,330
  330 K=K+1
      IF(OBJCODE(K).EQ.0)900,331
  331 IALPHA=2
      GO TO 318
C
C READ TAPE AND TEST DATA
  900 DO 901 I=1,72
  901 TOTAL(I)=0
      NPAGE=0
      PAGE=0
      ICONT=0
      IF(LOWLIM.EQ.0)902,903
  902 LOWLIM=1
  903 IF(UPLIM.EQ.0)904,905
  904 UPLIM=99999
  905 IF(POINT.LE.0)906,914
  906 IF(MODE.EQ.1)909,916
  908 CONTINUE
C
C SKIP FIRST RECORD AND EOF
  909 BUFFER IN(1,0)(BUFF1(1),BUFF1(1500))
 1909 IF(UNIT,1)1909,911,910
  910 PRINT 2003
 2003 FORMAT(1H ,27HEOF OR PARITY ON FIRST READ)
      GO TO 11
  911 BUFFER IN(1,0)(BUFF1(1),BUFF1(1500))
  912 IF(UNIT,1)912,913,916,913
  913 PRINT 2001
 2001 FORMAT(1H ,24HNO EOF FOR SECOND RECORD)
      GO TO 11
C
```

```
C TAPE IS NOT REWOUND
  914 IF(LOWLIM.GT.(POINT+IBETA))915,918
  915 IF(UNIT,1)915,916,953,954
C
C READ TAPE UNTIL LOWLIM IS IN CORE
  916 BUFFER IN(1,0)(BUFF1(1),BUFF1(1500))
      IBUFF=1
      POINT=POINT+IALPH
      IF(LOWLIM.GT.(POINT+IGAMA))915,917
  917 RCRD=LOWLIM
      N=LOWLIM-POINT+1
      GO TO 931
C
  918 IF(LOWLIM.LT.POINT)919,927
C
C INCIDENT WE WANT IS BACKWARD ON TAPE.REWIND IF MORE THAN HALFWAY BACK.
  919 IHALF=POINT/(2*IALPH)+1
      IBACK=(POINT+IBETA-LOWLIM)/IALPH
      IF(IBACK.GT.IHALF)920,924
C REWIND AND READ UP
  920 IF(UNIT,1)920,921,953,954
  921 REWIND 1
      IF(MODE.EQ.1)922,923
  922 POINT=0
      GO TO 908
  923 POINT=-99
      GO TO 916
C
C BACKSPACE TAPE
  924 POINT=POINT-IBACK*IALPH
  925 IF(UNIT,1)925,926,953,954
  926 BACKSPACE 1
      IBACK=IBACK-1
      IF(IBACK.EQ.0)916,926
C
C RECORD LOWLIM IS IN CORE
  927 RCRD=LOWLIM
      IF(LOWLIM.GT.(POINT+IGAMA))928,929
C LOWLIM IS IN PART OF BUFF CONTAINING HIGHEST NUMBERS
  928 N=LOWLIM-POINT-IGAMA
      GO TO 930
C LOWLIM IS IN PART OF BUFF CONTAINING LOWEST NUMBERS
  929 N=LOWLIM-POINT+1
      IF(IBUFF.EQ.1)1935,1932
  930 POINT=POINT+IALPH
      IF(IBUFF.EQ.1)931,934
C
  931 IF(UNIT,1)931,932,953,954
  932 BUFFER IN(1,0)(BUFF2(1),BUFF2(1500))
 1932 DO 933 I=1,15
  933 INCDNT(I)=BUFF1(15*(N-1)+I)
      IBUFF=2
      GO TO 937
C
  934 IF(UNIT,1)934,935,953,954
  935 BUFFER IN(1,0)(BUFF1(1),BUFF1(1500))
```

```
 1935 DO 936 I=1,15
  936 INCDNT(I)=BUFF2(15*(N-1)+I)
      IBUFF=1
C TEST FOR ZERO OR BLANK RECORD
  937 I=2
  938 IF(INCDNT(I).EQ.0.OR.INCDNT(I).EQ.8H          )1938,939
 1938 IF(I.EQ.15)948,2938
 2938 I=I+1
      GO TO 938
C TEST FOR NULL COORDINATE
  939 IF(INCDNT(2).EQ.0.OR.INCDNT(2).EQ.8H          )940,941
  940 IF(ICONT.EQ.1)634,948
C TEST FOR BCD CHARACTERS IN NUMERIC FIELD
  941 DECODE(30,9000,INCDNT(2))(TEST(I),I=1,28)
 9000 FORMAT(2X,28R1)
      I=1
  942 IF(TEST(I).GT.9)943,944
  943 IF(TEST(I).EQ.60B)944,946
  944 IF(I.EQ.28)947,945
  945 I=I+1
      GO TO 942
  946 PRINT 9001,RCRD
 9001 FORMAT(1H ,7HRECORD ,I5,35H HAS BCD CHARACTER IN NUMERIC FIELD)
      GO TO 634
C DECODE DATA FOR SELECTION TESTING
  947 DECODE(40,6000,INCDNT(1))COORD,X,Y,IDAY,IMONTH,IYEAR,OBJECT,ACTION
 6000 FORMAT(8X,R2,2I3,3I2,14X,I2,R2)
      ICONT=0
      GO TO 608
C
C CHECK STATUS OF TESTING
  948 IF(RCRD.EQ.UPLIM)500,949
  949 RCRD=RCRD+1
      IF(MODE.EQ.1)930,950
  950 IF(N.EQ.100)951,952
  951 N=1
      GO TO 930
  952 N=N+1
      IF(IBUFF.EQ.1)1935,1932
C
C TAPE READ ERRORS
  953 PRINT 6005
 6005 FORMAT(1H ,11HEOF ON TAPE)
      GO TO 955
  954 PRINT 6006
 6006 FORMAT(1H ,20HPARITY ERROR ON TAPE)
  955 REWIND 1
      IF(MODE.EQ.1)956,957
  956 POINT=0
      GO TO 500
  957 POINT=-99
      GO TO 500
C
  608 IF(OBJSEL.EQ.0)613,609
  609 I=1
  610 IF(OBJECT.EQ.OBJCODE(I))613,611
```

```
  611 IF(I.EQ.20)639,612
  612 I=I+1
      GO TO 610
  613 IF(ACTSEL.EQ.0)618,614
  614 J=1
  615 IF(ACTION.EQ.ACTCODE(J))618,616
  616 IF(J.EQ.20)639,617
  617 J=J+1
      GO TO 615
  618 IF(NCORD.EQ.0)628,619
  619 K=1
C PUT COORDINATE IN NUMERICAL FORM
  620 IF(COORD.EQ.CTRANS(K,1))624,621
  621 IF(K.EQ.50)623,622
  622 K=K+1
      GO TO 620
  623 PRINT 1012,RCRD
 1012 FORMAT(1H ,21HCOORDINATE OF RECORD ,I5,17HIS NOT IN COUNTRY)
      GO TO 639
  624 XP=X+CTRANS(K,2)
      YP=Y+CTRANS(K,3)
C
C TEST IF INCIDENT COORDINATES ARE IN SELECTION AREA
      IF((ATAB(1)*YP+BTAB(1)+5000)/10000.LE.XP)625,639
  625 IF((ATAB(2)*XP+BTAB(2)+5000)/10000.GE.YP)626,639
  626 IF((ATAB(3)*YP+BTAB(3)+5000)/10000.GE.XP)627,639
  627 IF((ATAB(4)*XP+BTAB(4)+5000)/10000.LE.YP)628,639
C
C TEST DATE OF INCIDENT
  628 L=1
      IDATE=(IYEAR*64+IMONTH)*64+IDAY
  629 IF(IDATE.GE.SPAN(L,1))632,630
  630 IF(L.EQ.JINT)639,631
  631 L=L+1
      GO TO 629
  632 IF(IDATE.LE.SPAN(L,2))633,630
C
C INCIDENT IS TO BE COUNTED
  633 TOTAL(L)=TOTAL(L)+1
      ICONT=1
 1633 IF(LPRNT.EQ.0)639,634
C
C DETAIL PRINTING
  634 DECODE(118,6001,INCDNT(1))(OUT(I),I=1,24)
 6001 FORMAT(8X,R8,2(3R2,R4),2R2,R1,3R3,8A8,A4)
 3634 NPAGE=NPAGE+1
      IF(NPAGE.GT.50)635,636
  635 NPAGE=1
      PRINT 6002
 6002 FORMAT(1H ,64X,6HSECRET)
      GO TO 637
  636 IF(NPAGE.EQ.1)637,638
  637 PAGE=PAGE+1
      PRINT 6003,PAGE
 6003 FORMAT(1H1,64X,6HSECRET,51X,5HPAGE ,I3//
     1*  RCRD     MAP      START DATE      STOP DATE  OBJ ACT UNT KIA WIA W
```

```
     2IA*31X,8HCOMMENTS/
     32X,*NO. COORDINATE DY MN YR TIME DY MN YR TIME*/1HA)
  638 PRINT 6004,RCRD,(OUT(I),I=1,24)
 6004 FORMAT(1H ,I5,1X,A8,1X,2(1X,3(R2,1X),R4),2(1X,R2),3X,R1,2X,
     13(R3,1X),8A8,A4)
  639 GO TO 948
C
C ALL DATA HAVE BEEN CHECKED.PRINT SUMS.
  500 PRINT 1018
      PRINT 1013
 1013 FORMAT(1H ,2X,25HDATES OF PERIOD     NUMBER,//4X,4HFROM,6X,2HTO,5X,
     19HINCIDENTS,//)
C UNPACK INTERVAL DATES
      I=1
  501 K=1
      J=1
  502 OP=1
      NOD=2
      PW=SPAN(I,J)
  503 CALL UNPACK
      TEMP(K)=UPW
      IF(OP.EQ.1)504,1503
 1503 IF(OP.EQ.3)2503,505
 2503 NOD=3
  504 K=K+1
      OP=OP+2
      GO TO 503
  505 IF(J.EQ.2)507,506
  506 J=2
      K=K+1
      GO TO 502
C PRINT SUMS
  507 PRINT 1014,(TEMP(L),L=1,6),TOTAL(I)
 1014 FORMAT(1H ,1X,2(2(I2,1H-),I2,1X),I8)
      IF(I.EQ.JINT)  2,508
  508 I=I+1
      GO TO 501
      END
```

APPENDIX B

ANALYSIS DATA (U)

TABLE B-1. MONTHLY SUMMARY OF VC OBJECTIVES, REGION 1 (U)

Date		Roads	Military Facilities	Civilian Facilities	Military Units	Aircraft	Area	Boats	Utilities	Civilians	Material	Total
Year	Month											
1963	3	--	--	--	--	--	--	--	--	--	--	--
	4	--	--	--	--	--	--	1	--	--	--	1
	5	--	1	2	--	--	--	2	--	--	--	5
	6	--	--	--	--	--	--	--	--	--	--	--
	7	--	--	--	--	--	--	--	--	--	--	--
	8	--	--	2	--	--	--	--	--	--	--	2
	9	--	1	--	--	--	--	--	--	--	--	1
	10	--	1	--	--	--	--	1	--	--	--	2
	11	--	--	1	--	--	--	--	--	--	--	1
	12	--	--	--	--	--	--	1	--	--	--	1
1964	1	--	--	2	--	--	--	--	--	--	--	2
	2	--	--	--	--	--	--	--	--	--	--	--
Total		--	3	7	--	--	--	5	--	--	--	15
1964	3	--	3	--	--	--	--	--	--	--	--	3
	4	--	--	--	--	--	--	--	--	--	--	--
	5	--	--	--	--	--	--	--	--	--	--	--
	6	--	1	2	--	--	--	--	--	--	--	3
	7	--	--	--	1	--	--	--	--	--	--	1
	8	--	--	--	--	--	--	--	--	--	--	--
	9	--	--	4	--	--	--	--	--	--	--	4
	10	--	1	1	--	--	--	--	--	--	--	2
	11	--	--	--	--	--	--	--	--	--	--	--
	12	--	--	2	--	--	--	--	--	--	--	2
1965	1	--	3	--	--	--	--	--	--	--	--	3
	2	--	1	1	--	--	1	--	--	--	--	3
Total		--	9	10	1	--	1	--	--	--	--	21

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TABLE B-2. MONTHLY SUMMARY OF VC ACTION, REGION 1 (U)

Before Defoliation[a]							After Defoliation[b]						
		Action Groups							Action Groups				
Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total
Year	Month						Year	Month					
1963	3	--	--	--	--	--	1964	3	--	3	--	--	9
	4	1	--	--	--	10		4	--	--	--	--	--
	5	3	1	1	--	35		5	--	--	--	--	--
	6	--	--	--	--	--		6	--	3	--	--	9
	7	--	--	--	--	--		7	--	1	--	--	3
	8	2	--	--	--	20		8	--	--	--	--	--
	9	1	--	--	--	10		9	--	2	2	--	10
	10	1	1	--	--	13		10	--	2	--	--	6
	11	1	--	--	--	10		11	--	--	--	--	--
	12	--	1	--	--	3		12	--	2	--	--	6
1964	1	1	--	1	--	12	1965	1	--	3	--	--	9
	2	--	--	--	--	--		2	--	3	--	--	9
Total		10	3	2	--	113			--	19	2	--	61

(a) W. T. = 113, n = 15, f = 1.25, μ_I = 7.53, μ_m = 9.42.
(b) W. T. = 61, n = 21, f = 1.75, μ_I = 2.91, μ_m = 5.08.

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TABLE B-3. MONTHLY SUMMARY OF VC OBJECTIVES, REGION 2, FIRST DEFOLIATION (U)

Date			Military	Civilian	Military							
Year	Month	Roads	Facilities	Facilities	Units	Aircraft	Area	Boats	Utilities	Civilians	Material	Total
1964	5	3	2	6	--	--	1	1	--	--	--	13
	6	1	10	2	--	--	1	--	--	1	--	15
	7	1	13	8	--	--	1	--	--	2	--	25
	8	2	9	4	2	--	2	--	--	1	--	20
	9	2	16	8	2	--	1	--	--	--	--	29
	10	1	7	9	2	--	--	4	--	--	--	23
	11	6	11	3	2	--	--	--	--	--	--	22
	12	4	32	7	3	--	3	--	--	1	--	50
1965	1	3	12	14	2	--	--	--	--	1	1	33
	2	2	6	3	--	--	1	--	--	--	--	12
	3	--	2	7	2	--	--	--	--	2	--	13
	4	1	3	11	1	--	--	--	--	1	--	7
Total		26	123	72	16	--	10	5	--	9	1	262
1965	5	5	13	4	--	--	--	--	--	5	1	28
	6	8	16	5	1	--	1	1	--	8	--	40
	7	5	3	3	--	--	1	1	--	4	--	18
	8	--	--	1	1	--	--	--	--	1	--	3
	9	--	2	3	--	--	--	--	--	5	--	10
	10	6	7	2	1	--	--	--	1	--	--	17
	11	2	15	7	--	--	1	--	--	3	--	28
	12	12	12	3	--	5	--	--	1	4	--	37
1966	1	10	14	1	1	19	1	--	1	3	--	50
	2	4	20	2	1	2	--	--	1	1	--	31
	3	2	13	1	2	4	1	--	--	7	--	30
	4	1	3	1	2	2	--	--	3	2	--	14
Total		56	118	33	9	32	5	2	7	43	1	306

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TABLE B-4. MONTHLY SUMMARY OF VC ACTION, REGION 2, FIRST DEFOLIATION (U)

Before Defoliation							After Defoliation						
		Action Groups							Action Groups				
Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6 S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total
Year	Month						Year	Month					
1964	5	1	6	6	--	40	1965	5	1	11	16	--	75
	6	--	13	2	--	43		6	--	27	13	--	107
	7	2	18	5	--	84		7	--	8	10	--	44
	8	3	15	2	--	79		8	--	1	2	--	7
	9	1	22	6	--	88		9	--	5	5	--	25
	10	--	20	3	--	66		10	--	10	7	--	44
	11	--	16	6	-	60		11	--	19	7	2	73
	12	--	32	18	--	132		12	--	20	16	1	93
1965	1	--	25	8	--	91	1966	1	--	38	9	3	135
	2	1	10	1	--	42		2	--	26	4	1	87
	3	--	8	5	--	34		3	--	19	9	2	77
	4	--	5	2	--	19		4	1	10	3	--	46
Total		8	190	64	--	778			2	194	101	9	813

(a) W. T. = 778, n = 262, f = 21.33, $_{I}$ = 2.97, $_{m}$ = 64.83.
(b) W.T. = 813, n = 306, f = 25.50, $_{I}$ = 2.66, $_{m}$ = 67.75.

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TABLE B-5. MONTHLY SUMMARY OF VC ACTION, REGION 2, (FIRST DEFOLIATION, AIRCRAFT INCIDENTS EXCLUDED (U)

Before Defoliation[a]							After Defoliation[b]						
		Action Groups							Action Groups				
Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total
Year	Month						Year	Month					
1964	5	1	6	6	--	40	1965	5	1	11	16	--	75
	6	--	13	2	--	43		6	--	27	13	--	107
	7	2	18	5	--	84		7	--	8	10	--	44
	8	3	15	2	--	79		8	--	1	2	--	7
	9	1	22	6	--	88		9	--	5	5	--	25
	10	--	20	3	--	66		10	--	10	7	--	44
	11	--	16	6	--	60		11	--	19	7	2	73
	12	--	32	18	--	132		12	--	15	16	1	78
1965	1	--	25	8	--	91	1966	1	--	19	9	3	78
	2	1	10	1	--	42		2	--	24	4	1	81
	3	--	8	5	--	34		3	--	15	9	2	65
	4	--	5	2	--	19		4	1	8	3	--	40
	Total	8	190	64	--	778			2	162	101	9	717

(a) W. T. = 778, n = 262, f = 21.83, μ_I = 2.97, μ_m = 64.83.
(b) W. T. = 717, n = 274, f = 22.83, μ_I = 2.62, μ_m = 59.75.

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TABLE B-6. MONTHLY SUMMARY OF VC OBJECTIVES, REGION 2, SECOND DEFOLIATION (U)

Date		Roads	Military Facilities	Civilian Facilities	Military Units	Aircraft	Area	Boats	Utilities	Civilians	Material	Total
Year	Month											
1965	1	3	12	14	2	--	--	--	--	1	1	33
	2	2	6	3	--	--	1	--	--	--	--	12
	3	--	2	7	2	--	--	--	--	2	--	13
	4	1	3	1	1	--	--	--	--	1	--	7
	5	5	13	4	--	--	--	--	--	5	1	28
	6	8	16	5	1	--	1	1	--	8	--	40
	7	6	3	3	--	--	1	1	--	4	--	18
	8	--	--	1	1	--	--	--	--	1	--	3
	9	--	2	3	--	--	--	--	--	5	--	10
	10	6	7	2	1	--	--	--	1	--	--	17
	11	2	15	7	--	--	1	--	--	3	--	28
	12	12	12	3	--	5	--	--	1	4	--	37
Total		45	91	53	8	5	4	2	2	34	2	246
	1	10	14	1	1	19	1	--	1	3	--	50
	2	4	20	2	1	2	--	--	1	1	--	31
	3	2	13	1	2	4	1	--	--	7	--	30
	4	1	3	1	2	2	--	--	3	2	--	14
	5	2	9	2	2	2	1	--	--	4	--	22
	6	1	8	2	4	6	2	--	--	2	3	28
	7	2	12	--	2	9	--	--	--	7	--	32
	8	5	3	--	2	3	--	--	1	1	--	15
	9	2	9	--	--	9	--	--	2	1	--	23
	10	--	13	1	4	13	--	--	--	2	--	33
	[illegible]	1	6	--	2	12	--	--	--	1	--	22
	[illegible]	1	3	--	3	8	--	--	--	--	--	15
Total		31	113	10	25	89	5	--	8	31	3	315

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TABLE B-7. MONTHLY SUMMARY OF VC ACTION, REGION 2, SECOND DEFOLIATION (U)

Before Defoliation[a]							After Defoliation[b]						
		Action Groups							Action Groups				
Date		A1,A2, A3,A4	M1,M8, S3,H1, H2,H3, H5	T1-T6, S1,S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Date		A1,A2, A3,A4	M1,M8, S3,H1, H2,H3 H5	T1-T6, S1,S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total
Year	Month						Year	Month					
1965	1	--	25	8	--	81	1966	1	--	38	9	3	135
	2	1	10	1	--	41		2	--	26	4	1	87
	3	--	8	5	--	34		3	--	19	9	2	77
	4	--	5	2	--	19		4	1	10	3	--	43
	5	1	11	16	--	75		5	1	16	3	2	66
	6	--	27	13	--	106		6	2	23	2	1	94
	7	--	8	10	--	44		7	1	23	6	2	93
	8	--	1	2	--	7		8	--	9	6	--	39
	9	--	5	5	--	25		9	--	22	--	1	67
	10	--	10	7	--	44		10	2	31	--	--	113
	11	--	19	7	2	73		11	--	20	2	--	64
	12	--	20	16	1	93		12	--	14	1	--	44
Total		2	149	92	3	642			7	251	45	12	922

(a) W.T. = 642, n = 246, f = 20.50, μ_I = 2.61, μ_m = 53.50.
(b) W.T. = 922, n = 315, f = 26.25, μ_I = 2.92, μ_m = 76.83.

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TABLE B-8. MONTHLY SUMMARY OF VC ACTION, REGION 2, SECOND DEFOLIATION, AIRCRAFT INCIDENTS EXCLUDED (U)

Before Defoliation[a]							After Defoliation[b]						
		Action Groups							Action Groups				
Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total
Year	Month						Year	Month					
1965	1	--	25	8	--	91	1966	1	--	19	9	3	78
	2	1	10	1	--	42		2	--	24	4	1	81
	3	--	8	5	--	34		3	--	15	9	2	65
	4	--	5	2	--	19		4	1	8	3	--	40
	5	1	11	16	--	75		5	1	14	3	2	60
	6	--	27	13	--	107		6	2	17	2	1	76
	7	--	8	10	--	44		7	1	14	6	2	66
	8	--	1	2	--	7		8	--	6	6	--	30
	9	--	5	5	--	25		9	--	13	--	1	40
	10	--	10	7	--	44		10	2	18	--	--	74
	11	--	19	7	2	73		11	--	8	2	--	28
	12	--	15	16	1	78		12	--	6	1	--	20
Total		2	144	92	3	639			7	162	45	12	658

(a) W.T. = 639, n = 241, f = 20.08, μ_I = 2.65, μ_m = 53.25.
(b) W.T. = 658, n = 226, f = 18.83, μ_I = 2.91, μ_m = 54.83.

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TABLE B-9. MONTHLY SUMMARY OF VC OBJECTIVES, REGION 3 (U)

Date			Military	Civilian	Military						
Year	Month	Roads	Facilities	Facilities	Units	Aircraft	Area	Boats	Utilities	Civilians	Materiel	Total
1964	12	1	--	1	--	--	--	--	--	--	--	2
1965	1	--	4	6	--	--	--	--	--	--	--	10
	2	--	1	--	1	--	--	--	--	--	--	2
	3	--	--	--	--	--	--	--	--	--	--	--
	4	--	1	1	1	--	--	--	--	--	--	3
	5	--	--	--	--	--	--	--	--	--	--	--
	6	--	1	--	1	--	--	--	--	--	--	2
	7	--	1	--	--	--	--	--	--	--	--	1
	8	--	--	--	--	--	--	--	--	--	--	--
	9	--	2	--	--	--	--	2	--	--	--	4
	10	--	--	2	--	--	--	--	--	--	-	2
	11	--	3	1	--	--	--	--	1	--	--	5
Total		1	13	11	3	--	--	2	1	--	--	31
1965	12	1	2	--	--	2	--	--	--	--	--	5
1966	1	--	1	1	--	1	--	--	--	--	--	3
	2	--	2	--	2	--	--	1	--	--	--	5
	3	--	--	--	--	1	--	--	--	--	--	1
	4	--	1	--	--	1	--	--	--	--	--	2
	5	--	1	--	--	5	--	--	--	--	--	6
	6	--	--	--	--	2	--	--	--	--	--	2
	7	--	2	--	--	--	--	--	--	--	--	2
	8	--	1	--	--	1	--	--	--	--	--	2
	9	--	--	--	--	2	--	--	--	2	--	4
	10	--	3	1	--	2	--	1	1	--	--	8
	11	--	2	--	--	1	--	--	--	--	--	3
Total		1	15	2	2	18	--	2	1	2	--	43

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TABLE B-10. MONTHLY SUMMARY OF VC ACTION, REGION 3 (U)

Before Defoliation[a]							After Defoliation[b]						
		Action Groups							Action Groups				
Date		A1,A2, A3,A4	M1,M8, S3,H1, H2,H3, H5	T1-T6, S1,S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Date		A1,A2, A3,A4	M1,M8, S3,H1, H2,H3, H5	T1-T6, S1,S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total
Year	Month						Year	Month					
1964	12	--	2	--	--	6	1965	12	--	3	2	--	13
1965	1	2	5	3	--	41	1966	1	--	3	--	--	9
	2	1	1	--	--	13		2	--	4	--	1	13
	3	--	--	--	--	--		3	--	1	--	--	3
	4	--	2	1	--	8		4	--	2	--	--	6
	5	--	--	--	--	--		5	--	6	--	--	18
	6	--	2	--	--	6		6	--	2	--	--	6
	7	--	1	--	--	3		7	--	2	--	--	6
	8	--	--	--	--	--		8	--	2	--	--	6
	9	--	2	2	--	10		9	--	4	--	--	12
	10	--	2	--	--	6		10	1	7	--	--	31
	11	1	4	--	--	22		11	--	3	-	--	9
Total		4	21	6	--	115			1	39	2	1	132

(a) W.T. = 115, n = 31, f = 2.58, μ_I = 3.71, μ_m = 9.58.
(b) W.T. = 132, n = 43, f = 3.58, μ_I = 3.07, μ_m = 11.00.

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TABLE B-11. MONTHLY SUMMARY OF VC OBJECTIVES, REGION 3A (U)

Date			Military	Civilian	Military						
Year	Month	Roads	Facilities	Facilities	Units	Aircraft	Area	Boats	Utilities	Civilians	Materiel	Total
1964	12	1	--	1	--	--	--	--	--	--	--	2
1965	1	--	4	6	--	--	--	--	--	--	--	10
	2	--	1	--	1	--	--	--	--	--	--	2
	3	--	--	--	--	--	--	--	--	--	--	--
	4	--	1	--	1	--	--	--	--	--	--	2
	5	--	--	--	--	--	--	--	--	--	--	--
	6	--	1	--	--	--	--	--	--	--	--	1
	7	--	1	--	--	--	--	--	--	--	--	1
	8	--	--	--	--	--	--	--	--	--	--	--
	9	--	2	--	--	--	--	--	--	--	--	2
	10	--	--	2	--	--	--	--	--	--	--	2
	11	--	3	1	--	--	--	--	--	--	--	4
Total		1	13	11	2	--	--	--	--	--	--	26
1965	12	1	2	--	--	2	--	--	--	--	--	5
1966	1	--	1	1	--	1	--	--	--	--	--	3
	2	--	2	--	2	--	--	1	--	--	--	5
	3	--	--	--	--	1	--	--	--	--	--	1
	4	--	1	--	--	--	--	--	--	--	--	1
	5	--	1	--	--	--	--	--	--	--	--	1
	6	--	--	--	--	1	--	--	--	--	--	1
	7	--	2	--	--	--	--	--	--	--	--	2
	8	--	1	--	--	--	--	--	--	--	--	1
	9	--	--	--	--	1	--	--	--	2	--	3
	10	--	3	1	--	1	--	1	1	--	--	7
	11	--	2	--	--	1	--	--	--	--	--	3
Total		1	15	2	2	8	--	2	1	2	--	33

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TABLE B-12. MONTHLY SUMMARY OF VC OBJECTIVES, REGION 3B (U)

Date		Roads	Military Facilities	Civilian Facilities	Military Units	Aircraft	Area	Boats	Utilities	Civilians	Materiel	Total
Year	Month											
1964	12	--	--	--	--	--	--	--	--	--	--	--
1965	1	--	--	--	--	--	--	--	--	--	--	--
	2	--	--	--	--	--	--	--	--	--	--	--
	3	--	--	--	--	--	--	--	--	--	--	--
	4	--	--	1	--	--	--	--	--	--	--	1
	5	--	--	--	--	--	--	--	--	--	--	--
	6	--	--	--	1	--	--	--	--	--	--	1
	7	--	--	--	--	--	--	--	--	--	--	--
	8	--	--	--	--	--	--	--	--	--	--	--
	9	--	--	--	--	--	--	2	--	--	--	2
	10	--	--	--	--	--	--	--	--	--	--	--
	11	--	--	--	--	--	--	--	1	--	--	1
Total		--	--	1	1	--	--	2	1	--	--	5
1965	12	--	--	--	--	--	--	--	--	--	--	--
1966	1	--	--	--	--	--	--	--	--	--	--	--
	2	--	--	--	--	--	--	--	--	--	--	--
	3	--	--	--	--	--	--	--	--	--	--	--
	4	--	--	--	--	1	--	--	--	--	--	1
	5	--	--	--	--	5	--	--	--	--	--	5
	6	--	--	--	--	1	--	--	--	--	--	1
	7	--	--	--	--	--	--	--	--	--	--	--
	8	--	--	--	--	1	--	--	--	--	--	1
	9	--	--	--	--	1	--	--	--	--	--	1
	10	--	--	--	--	1	--	--	--	--	--	1
	11	--	--	--	--	--	--	--	--	--	--	--
Total		--	--	--	--	10	--	--	--	--	--	10

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TABLE B-13. MONTHLY SUMMARY OF VC OBJECTIVES, REGION 4 (U)

Date Year	Month	Roads	Military Facilities	Civilian Facilities	Military Units	Aircraft	Area	Boats	Utilities	Civilians	Materiel	Total
1964	12	--	12	8	7	--	--	--	--	--	--	27
1965	1	--	4	4	2	--	--	--	--	--	--	10
	2	5	3	--	2	--	--	--	--	--	--	10
	3	--	2	--	--	--	--	--	--	--	--	2
	4	3	4	--	--	--	--	--	--	--	--	7
	5	6	10	--	--	--	--	--	--	--	--	16
	6	10	4	1	3	--	3	--	--	--	--	21
	7	8	6	1	--	--	4	--	--	--	--	19
	8	2	2	3	2	--	--	--	--	--	--	9
	9	4	3	--	1	--	--	--	1	--	--	9
	10	1	1	1	1	--	--	--	--	--	--	4
	11	--	10	1	--	--	--	--	--	--	--	11
Total		39	61	19	18	--	7	--	1	--	--	145
1965	12	--	4	--	--	--	--	--	--	--	--	4
1966	1	--	2	--	1	--	--	--	--	--	--	3
	2	--	1	--	--	--	--	--	--	--	--	1
	3	1	--	--	--	--	--	--	--	--	--	1
	4	--	1	--	--	--	1	--	--	--	--	2
	5	--	2	--	--	--	--	--	--	--	--	2
	6	--	3	--	--	--	--	--	--	--	--	3
	7	1	5	--	2	--	2	--	--	--	--	10
	8	--	2	--	--	--	--	--	--	--	--	2
	9	1	4	--	--	--	3	--	--	--	--	8
	10	4	2	--	--	2	--	--	--	--	--	8
	11	--	2	--	--	--	--	--	--	--	--	2
Total		7	28	--	3	2	6	--	--	--	--	46

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TABLE B-14. MONTHLY SUMMARY OF VC ACTION, REGION 4 (U)

Before Defoliation[a]							After Defoliation[b]						
		Action Groups							Action Groups				
Date		A1, A2 A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total
Year	Month						Year	Month					
1964	12	--	26	1	--	80	1965	12	--	4	--	--	12
1965	1	--	10	--	--	30	1966	1	--	3	--	--	9
	2	--	8	2	--	28		2	--	1	--	--	3
	3	--	2	--	--	6		3	--	1	--	--	3
	4	--	7	--	--	21		4	--	1	1	--	5
	5	1	13	2	--	53		5	--	2	--	--	6
	6	--	20	1	--	62		6	--	3	--	--	9
	7	--	18	1	--	56		7	1	8	1	--	36
	8	--	9	--	--	27		8	--	2	--	--	6
	9	--	7	2	--	25		9	1	7	--	--	31
	10	--	3	1	--	11		10	--	8	--	--	24
	11	--	11	--	--	33		11	--	2	--	--	6
Total		1	134	10	--	432			2	42	2	--	150

(a) W.T. = 432, n = 145, f = 12.08, μ_I = 2.98, μ_m = 36.00.
(b) W.T. = 150, n = 46, f = 3.83, μ_I = 3.26, μ_m = 12.50.

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TABLE B-15. MONTHLY SUMMARY OF VC OBJECTIVES, REGION 5 (U)

Date		Roads	Military Facilities	Civilian Facilities	Military Units	Aircraft	Area	Boats	Utilities	Civilians	Materiel	Total
Year	Month											
1964	3	6	12	1	2	--	--	--	--	--	--	21
	4	6	6	--	1	--	--	--	--	--	--	13
	5	6	20	2	4	--	--	--	--	2	--	34
	6	21	13	3	5	--	2	1	--	--	--	45
	7	27	22	3	3	--	1	--	--	--	--	56
	8	50	33	1	2	--	--	--	--	3	--	89
	9	47	33	2	6	--	1	--	--	2	--	91
	10	15	9	1	1	--	--	--	--	--	--	26
	11	2	12	1	2	--	--	--	--	2	--	19
	12	18	16	1	3	--	1	--	--	--	--	39
1965	1	13	13	8	8	--	--	--	--	--	--	47
	2	21	6	11	6	--	--	--	2	1	--	47
Total		237	195	34	43	--	5	1	2	10	--	527
1965	3	10	10	4	2	--	--	--	--	2	--	28
	4	9	6	1	3	1	--	--	--	2	--	22
	5	19	6	3	3	--	--	--	--	--	--	31
	6	18	7	1	7	--	--	--	--	3	--	36
	7	9	2	2	1	--	1	--	1	--	--	16
	8	9	1	1	2	--	1	--	--	--	--	14
	9	5	1	--	1	--	--	--	--	--	--	7
	10	6	4	2	--	--	--	--	--	1	--	13
	11	3	3	--	4	--	--	--	--	1	--	11
	12	24	23	1	1	4	--	--	--	2	--	55
1966	1	3	2	--	1	1	1	--	--	--	--	8
	2	3	3	--	2	--	--	--	--	--	--	8
Total		118	68	15	27	6	3	--	1	11	--	249

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TABLE B-16. MONTHLY SUMMARY OF VC ACTION, REGION 5 (U)

Before Defoliation[a]							After Defoliation[b]						
		Action Groups							Action Groups				
Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Date		A1, A2, A3, A4	M1, M8 S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7. H4	E1-E3, P1-P5	Weighted Total
Year	Month						Year	Month					
1964	3	--	13	8	--	55	1965	3	1	15	12	--	79
	4	--	11	2	--	37		4	--	9	13	--	53
	5	1	25	8	--	101		5	--	12	19	--	74
	6	1	25	19	--	123		6	--	16	20	--	88
	7	1	29	26	--	149		7	--	6	10	--	38
	8	--	36	53	--	214		8	1	4	9	--	40
	9	1	43	47	--	233		9	--	2	5	--	16
	10	--	11	15	--	63		10	1	4	7	1	37
	11	--	16	3	--	54		11	--	7	4	--	29
	12	1	20	18	--	106		12	--	25	28	2	133
1965	1	1	27	19	--	129	1966	1	1	6	1	--	30
	2	--	29	18	--	123		2	1	3	4	--	27
Total		6	285	236	--	1387			5	109	132	3	644

(a) W.T. = 1387, n = 527, f = 43.92, μ_I = 2.63, μ_m = 115.58.
(b) W.T. = 644, n = 247, f = 20.58, μ_I = 2.61, μ_m = 53.67.

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TABLE B-17. MONTHLY SUMMARY OF VC OBJECTIVES, REGION 6 (U)

Date		Roads	Military Facilities	Civilian Facilities	Military Units	Aircraft	Area	Boats	Utilities	Civilians	Materiel	Total
Year	Month											
1964	11	--	3	--	--	--	--	--	--	--	--	3
	12	--	1	--	--	--	--	--	--	--	--	1
1965	1	--	--	--	--	--	--	--	--	--	--	--
	2	--	3	--	2	--	--	1	--	--	--	6
	3	--	1	--	--	--	--	--	--	--	--	1
	4	--	1	--	--	--	--	--	--	--	--	1
	5	--	--	--	--	--	1	--	--	--	--	1
	6	--	2	--	1	--	--	--	--	--	--	3
	7	--	3	--	2	--	1	--	--	1	--	7
	8	--	--	--	2	--	--	--	--	--	--	2
	9	--	--	--	--	--	--	--	--	--	--	--
	10	--	--	--	--	--	--	--	--	--	--	--
Total		--	14	--	7	--	2	1	--	1	--	25
1965	11	--	--	--	1	--	--	--	--	1	--	2
	12	--	1	--	1	2	--	--	--	--	--	4
1966	1	--	2	--	6	10	--	--	--	--	--	18
	2	--	1	--	1	1	--	--	--	--	--	3
	3	--	1	--	1	4	--	--	--	--	--	6
	4	--	2	--	--	--	--	--	--	--	--	2
	5	--	--	--	1	1	--	--	--	--	--	2
	6	--	--	--	2	8	--	2	--	--	--	12
	7	--	--	1	8	3	--	--	--	--	--	12
	8	--	--	--	1	1	--	--	--	--	--	2
	9	--	2	1	4	4	--	--	--	1	--	12
	10	--	--	--	2	7	--	--	--	--	--	9
Total		--	14	2	28	41	--	2	--	2	--	84

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TABLE B-18. MONTHLY SUMMARY OF VC ACTION, REGION 6 (U)

Before Defoliation[a]							After Defoliation[b]						
Date		Action Groups					Date		Action Groups				
Year	Month	A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Year	Month	A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7 H4	E1-E3, P1-P5	Weighted Total
1964	11	--	3	--	--	9	1965	11	--	1	1	--	5
	12	--	1	--	--	3		12	--	4	--	--	12
1965	1	--	--	--	--	--	1966	1	--	18	--	--	54
	2	--	6	--	--	18		2	--	3	--	--	9
	3	--	1	--	--	3		3	--	6	--	--	18
	4	--	1	--	--	3		4	--	2	--	--	6
	5	--	1	--	--	3		5	--	2	--	--	6
	6	--	3	--	--	9		6	--	12	--	--	36
	7	--	6	1	--	20		7	--	12	--	--	36
	8	--	2	--	--	6		8	--	2	--	--	6
	9	--	--	--	--	--		9	--	12	--	--	36
	10	--	--	--	--	--		10	--	9	--	--	27
Total		--	24	1	--	74			--	83	1	--	251

(a) W. T. = 74, n = 25, f = 2.08, μ_1 = 2.96, μ_m = 6.17.
(b) W. T. = 251, n = 84, f = 7.00, μ_I = 2.99, μ_m = 20.90.

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TABLE B-19. MONTHLY SUMMARY OF VC ACTION, REGION 6, INCIDENTS INVOLVING AIRCRAFT AND MILITARY PERSONNEL OMITTED (U)

Before Defoliation[a]							After Defoliation[b]						
		Action Groups						Action Groups					
Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Date	A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1, T6, S1, S2, M2, M7, H4	E1-E3, P1-P5	Weighted Total
Year	Month						Year	Month					
1964	11	--	3	--	--	9	1965	11	--	--	1	--	2
	12	--	1	--	--	3		12	--	1	--	--	3
1965	1	--	--	--	--	--	1966	1	--	2	--	--	6
	2	--	4	--	--	12		2	--	1	--	--	3
	3	--	1	--	--	3		3	--	1	--	--	3
	4	--	1	--	--	3		4	--	2	--	--	6
	5	--	1	--	--	3		5	--	--	--	--	--
	6	--	2	--	--	6		6	--	2	--	--	6
	7	--	4	1	--	14		7	--	1	--	--	3
	8	--	1	--	--	3		8	--	--	--	--	--
	9	--	--	--	--	--		9	--	4	--	--	12
	10	--	--	--	--	--		10	--	--	--	--	--
Total		--	18	1	--	56			--	14	1	--	44

(a) W. T. = 56, n = 19, f = 1.58, μ_I = 2.95, μ_m = 4.67.
(b) W. T. = 44, n = 15, f = 1.25, μ_I = 2.93, μ_m = 3.67.

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TABLE B-20. MONTHLY SUMMARY OF VC OBJECTIVES, REGION 7 (U)

Date		Roads	Military Facilities	Civilian Facilities	Military Units	Aircraft	Area	Boats	Utilities	Civilians	Materiel	Total
Year	Month											
1965	1	--	1	--	--	--	--	1	--	--	--	2
	2	--	--	--	--	--	--	--	--	--	--	--
	3	--	1	--	--	--	--	1	--	--	--	2
	4	--	--	--	1	--	--	2	--	1	--	4
	5	--	--	1	--	--	--	1	--	--	--	2
	6	--	1	1	--	--	--	1	--	--	--	3
	7	--	--	--	--	--	--	--	--	--	--	--
	8	--	--	--	--	--	--	5	--	1	--	6
	9	--	--	1	--	--	--	3	--	--	--	4
	10	--	--	--	--	--	--	2	--	--	--	2
	11	--	--	--	--	--	--	--	--	--	--	--
	12	--	--	--	--	--	--	--	--	--	--	--
Total		--	3	3	1	--	--	16	--	2	--	25
1966	1	--	--	--	--	--	--	--	--	1	--	1
	2	--	--	1	1	--	--	1	--	--	--	3
	3	1	--	--	1	1	--	6	--	--	--	9
	4	--	--	--	--	--	--	1	--	--	--	1
	5	--	--	--	1	1	--	--	--	--	--	2
	6	--	1	--	1	--	--	--	--	--	--	2
	7	--	--	--	--	--	--	1	--	--	--	1
	8	--	--	--	--	1	--	1	--	--	--	2
	9	--	2	--	1	2	--	1	--	--	--	6
	10	--	--	--	1	7	--	4	--	--	--	12
	11	--	1	--	2	--	--	--	--	1	--	4
	12	--	--	--	1	--	--	--	--	--	--	1
Total		1	4	1	9	12	--	15	--	2	--	44

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TABLE B-21. MONTHLY SUMMARY OF VC ACTION, REGION 7(U)

Before Defoliation(a)							After Defoliation(b)						
		Action Groups						Action Groups					
Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Date	A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total
Year	Month						Year Month					
1965	1	--	1	1		5	1966 1	--	--	1	--	2
	2	--	--	--	--	--	2	--	2	1	--	8
	3	--	2	--	--	6	3	--	9	--	--	27
	4	--	2	2	--	10	4	--	1	--	--	3
	5	--	2	--	--	6	5	--	2	--	--	6
	6	--	2	1	--	8	6	--	1	1	--	5
	7	--	--	--	--	--	7	--	1	--	--	3
	8	--	3	3	--	15	8	--	2	--	--	6
	9	--	3	1	--	11	9	--	6	--	--	18
	10	--	1	1	--	5	10	--	12	--	--	36
	11	--	--	--	--	--	11	--	4	--	--	12
	12	--	--	--	--	--	12	--	1	--	--	3
Total		--	16	9	--	66	Total	--	41	3	--	129

(a) W.T. = 66, n = 25, f = 2.08, μ_I = 2.64, μ_m = 5.50.

(b) W.T. = 129, n = 44, f = 3.67, μ_I = 2.93, μ_m = 10.75.

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TABLE B-22. MONTHLY SUMMARY OF VC ACTION, REGION 7, INCIDENTS INVOLVING AIRCRAFT AND MILITARY PERSONNEL OMITTED(U)

Before Defoliation(a)							After Defoliation(b)						
		Action Groups						Action Groups					
Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Date	A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total
Year	Month						Year	Month					
1965	1	--	1	1	--	5	1966	1	--	--	1	--	2
	2	--	--	--	--	--		2	--	1	1	--	5
	3	--	2	--	--	6		3	--	7	--	--	21
	4	--	1	2	--	7		4	--	1	--	--	3
	5	--	2	--	--	6		5	--	--	--	--	--
	6	--	2	1	--	8		6	--	--	1	--	2
	7	--	--	--	--	--		7	--	1	--	--	3
	8	--	3	3	--	15		8	--	--	--	--	--
	9	--	3	1	--	11		9	--	3	--	--	9
	10	--	1	1	--	5		10	--	4	--	--	12
	11	--	--	--	--	--		11	--	2	--	--	6
	12	--	--	--	--	--		12	--	--	--	--	--
Total		--	15	9	--	63	Total		--	19	3	--	63

(a) W. T. = 63, n = 24, f = 2.00, μ_I = 2.63, μ_m = 5.25.
(b) W. T. = 63, n = 22, f = 1.83, μ_I = 2.86, μ_m = 5.25.

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TABLE B-23. MONTHLY SUMMARY OF VC OBJECTIVES, REGION 8 (U)

Date			Military	Civilian	Military							
Year	Month	Roads	Facilities	Facilities	Units	Aircraft	Area	Boats	Utilities	Civilians	Material	Total
1964	12	24	6	14	2	--	1	--	--	--	--	47
1965	1	26	4	8	6	--	--	--	--	2	--	46
	2	12	3	3	--	--	2	--	--	--	--	20
	3	5	5	9	1	--	1	--	--	3	--	24
	4	1	1	6	4	--	3	--	--	2	--	17
	5	1	3	7	4	--	2	--	1	4	--	22
	6	28	4	6	9	--	--	--	1	7	--	55
	7	19	6	8	--	--	3	--	3	1	--	40
	8	13	2	4	6	--	2	--	2	3	--	32
	9	13	--	6	3	--	--	--	--	--	--	22
	10	13	--	3	5	--	--	2	--	1	--	24
	11	14	1	3	1	--	2	--	1	--	--	22
Total		169	35	77	41	--	16	2	8	23	--	371
1965	12	3	2	9	12	7	1	1	3	6	--	44
1966	1	1	--	3	8	9	--	--	--	--	--	21
	2	--	1	1	12	9	--	--	--	--	--	23
	3	3	1	1	4	11	--	--	--	1	--	21
	4	5	6	1	52	26	2	--	1	2	--	95
	5	5	3	--	33	1	--	--	--	2	--	44
	6	4	4	1	39	7	--	--	--	--	--	55
	7	2	4	--	11	6	--	--	--	--	--	23
	8	13	4	--	12	5	1	--	--	--	--	35
	9	8	3	1	8	5	--	--	--	--	--	25
	10	5	3	1	6	13	--	--	--	--	--	28
	11	1	7	--	4	9	1	--	--	1	--	23
Total		50	38	18	201	108	5	1	4	12	--	437

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TABLE B-24. MONTHLY SUMMARY OF VC ACTION, REGION 8 (U)

Before Defoliation[a]							After Defoliation[b]						
		Action Groups							Action Groups				
Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Date		A1, A2, A3, A4	M1, M8, S3, H1, H2, H3, H5	T1-T6, S1, S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total
Year	Month						Year	Month					
1964	12	3	23	21	--	141	1965	12	1	30	7	6	120
1965	1	1	13	32	--	113	1966	1	--	18	3	--	60
	2	--	8	12	--	48		2	--	21	1	1	66
	3	--	15	9	--	63		3	--	16	5	--	58
	4	--	11	6	--	45		4	2	89	4	--	295
	5	--	13	9	--	57		5	--	41	3	--	129
	6	1	16	38	--	134		6	--	55	--	--	165
	7	1	21	18	--	109		7	1	22	--	--	76
	8	--	14	18	--	78		8	3	27	5	--	121
	9	--	7	15	--	51		9	1	20	4	--	78
	10	--	10	14	--	58		10	1	26	1	--	90
	11	--	8	9	5	47		11	1	21	1	--	75
Total		6	159	201	5	944			10	386	34	7	1333

(a) W.T. = 944, n = 371, f = 30.92, μ_I = 2.54, μ_m = 78.66.
(b) W.T. = 1333, n = 437, f = 36.41, μ_I = 3.05, μ_m = 111.08.

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TABLE B-25. MONTHLY SUMMARY OF VC ACTION, REGION 8, INCIDENTS INVOLVING AIRCRAFT AND MILITARY PERSONNEL OMITTED (U)

Before Defoliation[a]							After Defoliation[b]						
		Action Groups							Action Groups				
Date		A1,A2, A3,A4	M1,M8, S3,H1, H2,H3, H5	T1-T6, S1,S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total	Date		A1,A2, A3,A4	M1,M8, S3,H1, H2,H3, H5	T1-T6, S1,S2, M2-M7, H4	E1-E3, P1-P5	Weighted Total
Year	Month						Year	Month					
1964	12	3	21	21	--	135	1965	12	1	11	7	6	63
1965	1	1	7	39	--	95	1966	1	--	1	3	--	9
	2	--	8	12	--	48		2	--	--	1	1	3
	3	--	14	9	--	60		3	--	1	5	--	13
	4	--	7	6	--	33		4	2	11	4	--	61
	5	--	9	9	--	45		5	--	7	3	--	27
	6	1	7	38	--	107		6	--	9	--	--	27
	7	1	21	18	--	109		7	1	4	--	--	22
	8	--	8	18	--	60		8	3	10	5	--	70
	9	--	4	15	--	42		9	1	7	4	--	39
	10	--	5	14	--	43		10	1	7	1	--	33
	11	--	7	9	5	44		11	1	8	1	--	36
Total		6	178	201	5	821			10	76	34	7	403

(a) W.T. = 821, n = 330, f = 27.50, μ_I = 2.48, μ_m = 68.42.
(b) W.T. = 403, n = 127, f = 10.58, μ_I = 3.17, μ_m = 33.58.

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APPENDIX C

VC ACTION AND OBJECTIVE CODES (U)

TABLE C-1. VC ACTION CODES (U)

Code	English Equivalent
A1	Performed aggregated armed attacks
A2	Attacked
A3	Ambushed
A4	Engaged
E1	Covertly entered
E2	Overtly entered
E3	Entered
H1	Performed aggregated harassments
H2	Conducted harassing fire on
H3	Bombed
H4	Harassed
H5	Fired on
M1	Mined
M2	Stopped
M3	Blocked
M4	Destroyed
M5	Damaged
M6	Stole
M7	Burned
M8	Booby trapped
P1	Performed aggregated acts of propaganda
P2	Propagandized
P3	Lectured
P4	Distributed leaflets to
P5	Demonstrated to
S1	Performed aggregated acts of sabotage
S2	Sabotaged
S3	Sabotaged (with explosives)
T1	Performed aggregated acts of terrorism
T2	Terrorized
T3	Assassinated
T4	Murdered
T5	Kidnapped
T6	Captured

TABLE C-2. VC OBJECTIVE CODES (U)

Code(a)	English Equivalent	Code(a)	English Equivalent
9	A school	54	A jeep
10	A military post	55	A train
11	An outpost	56	A cart
12	A base	57	A vehicle
13	A junk base	58	An armored car
14	An airfield	60	A sampan
15	A watchtower	61	A junk
16	A blockhouse	62	A boat
17	Military facilities	63	A naval craft
18	A camp	64	A ship
19	A bivovac	70	A road
20	A NRL hamlet	71	A vehicular bridge
21	A NRL hamlet under construction	72	A railroad bridge
22	A security fence(s)	73	A bridge
23	NRL hamlet facilities	74	Railroad tracks
30	A hamlet	75	Railroad facilities
31	A village	76	Communicating lines
32	A village office	77	Communicating facilities
33	A district office	78	A canal
34	A province office	79	Waterways
35	A land development center	80	A village official(s)
36	A house(s)	81	A hamlet official(s)
37	A building(s)	82	A civil official(s)
38	A church(s)	83	A civilian(s)
39	Civil facilities	84	Inhabitants
40	An armed helicopter	85	A military unit
41	An unarmed helicopter	86	Military personnel
42	A helicopter(s)	90	Firearms/ammunition
43	A combat aircraft(s)	91	Foodstuffs
44	A support aircraft(s)	92	Livestock
45	An aircraft	93	Medical supplies
50	A motor convoy	94	An area
51	A truck	95	Construction equipment
52	A bus	96	Power lines
53	An auto	97	A culvert

(a) Code equivalents were not available for the codes shown below. Examination of the comments from the incident files suggest the indicated categories.

Codes	
88, 89	Military unit
2	Materiel
7, 8	Civilian facility.